Chapter 3

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American widgeon

Alternatives, Including the Service-preferred Alternative

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Introduction

This chapter begins with a description of the process we used to formulate the alternatives for both Mason Neck and Featherstone Refuges. Next, we present detailed descriptions of the alternatives for each refuge in two parts: Part One covers Mason Neck Refuge; Part Two covers Featherstone Refuge. Parts One and Two both start with a description of actions common to all alternatives for that refuge. We also identify decisions we are not making at this time, and that will require additional NEPA analysis before a decision can be made. Next we present the goals, objectives and strategies for the alternatives we analyzed in detail for each refuge. Finally, each refuge part concludes with a tabulated comparison (table 3.1 for Mason Neck Refuge; table 3.2 for Featherstone Refuge) summarizing how each of the alternatives addresses key issues, supports major programs, and achieves the goals we defined for the refuges.

Formulating Alternatives that Relate Goals, Objectives, and Strategies

Each of the management alternatives we describe in this chapter includes a set of refuge goals, objectives to achieve those goals, and a series of strategies to implement them.

Refuge goals are intentionally broad, descriptive statements of the desired future condition for a refuge's resources. By design, they are less quantitative, and more prescriptive, in defining the targets of our management. They also articulate the principal elements of refuge purposes and our vision statements, and provide a foundation for developing specific management objectives and strategies. Goals do not vary between the alternatives. As noted in chapter 1, developing a strategic plan to achieve the goals is the purpose for developing the CCP. The degree to which the alternatives achieve those goals is the basis for selecting among the alternatives.

Objectives are essentially incremental steps toward achieving a goal; they further define management targets in measurable terms. They typically vary among the alternatives and provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating our success. The Service guidance in "Writing Refuge Management Goals and Objectives: A Handbook" (USFWS, 2004) recommends that objectives possess five properties to be "SMART": (1) specific; (2) measurable; (3) achievable; (4) results-oriented; and (5) time-fixed. A "rationale" accompanies each objective to explain its context and why we think it is important. We will use the objectives in the alternative selected for the final CCP to write refuge step-down plans, which we describe later in this chapter.

The strategies for each objective are the specific or combined actions, tools, or techniques we may employ to achieve an objective. Strategies may also vary among the alternatives. The list of strategies under each objective identifies the potential suite of actions we may implement. We will evaluate most of them further as to how, when, and where they should be implemented in refuge step-down plans. We will measure our success, in part, by how well our strategies achieve our objectives and goals.

Our Service-preferred alternative B also lists biological monitoring elements which are recommended ways to measure our success with respect to achieving our biological program objectives. The results of this monitoring may also trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives.

Developing Refuge CCP Alternatives, including the "No Action" Alternative

After identifying a wide range of possible management objectives and strategies that could achieve our goals, we began the process of designing management alternatives. Simply put, alternatives are packages of complementary objectives and strategies designed to meet refuge purposes, the Refuge System mission, and our refuge vision and goals, while responding to the issues and opportunities identified during the planning process.

In this draft CCP/EA, we fully analyze three alternatives for Mason Neck Refuge and two alternatives for Featherstone Refuge which characterize different ways of managing each refuge over the next 15 years. We believe they represent a reasonable range of alternative proposals for achieving the refuge purpose, vision and goals, and addressing the issues described in chapter 1. Unless otherwise noted, all actions would be implemented by refuge staff.

Mason Neck Refuge Alternatives

Alternative A (Current Management) satisfies the NEPA requirement of a "no action" alternative, which we define as "continuing current management." It describes our existing management priorities and activities, and serves as a baseline for comparing and contrasting alternatives B and C. We suggest you first read chapter 2, "Description of the Affected Environment," for detailed descriptions of current refuge resources and programs.

Alternative B (Improved Management for Federal Trust Resources) is the Service-preferred alternative. It combines the actions we believe would best achieve that refuge's purposes, vision and goals, and best respond to public issues. It would enhance our management of refuge habitats to support Federal trust resources and species of conservation concern. In particular, our priority would be to protect the refuge's upland forests to benefit bald eagles, great blue heron, and other forest-dependent migratory birds and to protect the refuge's marsh habitat to benefit eagles, waterfowl, wading and waterbirds, and interjurisdictional fish. Our Mason Neck Refuge visitor service's program would expand to provide an increased diversity of compatible wildlife-dependent activities, with emphasis on wildlife observation, photography, and interpretation. We would improve our current trails and add new trails, observation platforms, and photography blinds. We would expand our interpretive programs and outreach efforts to inform and involve more people in supporting the values of the refuge.

Alternative C (Enhanced Public Use Management) would manage habitat similar to alternative A, but would expand wildlife-dependent public use programs beyond that which is proposed under either alternatives A or B. We would devote more staff time and resources to improving each of the six priority public uses. For example, we would provide additional opportunities by offering a muzzleloader deer hunting season, constructing photography blinds, and offering more guided and self-guided wildlife observation tours and environmental education programs.

Featherstone Refuge Alternatives

Similar to Mason Neck Refuge, alternative A (Current Management) for Featherstone Refuge, would meet the NEPA requirement of a "no action" alternative. It describes our existing management activities.

Alternative B (Enhanced Management) is the Service-preferred alternative. Habitat and species management would include protecting sensitive nesting areas from human disturbance, and monitoring for invasive plants, pests, and pathogens to avoid catastrophic loss or degradation of habitat. With partner assistance, we would establish baseline monitoring of key resources, including the refuge shoreline where erosion and other threats are a concern.

Under alternative B, we would also continue to work with Prince William County and the NPS to secure public parking and pedestrian access to the refuge, and connect with the PHNS Trail, which has been an issue since refuge establishment. Once that access is secured and we have staff to support visitor programs, we would provide opportunities for wildlife observation and nature photography on designated trails, and fishing at designated sites. Under Alternative B, within five years, we would also evaluate a proposal to provide opportunities for a waterfowl hunt and/or a deer hunt to be managed in cooperation with the VDGIF. Other hunt program alternatives, including no action, would be considered in that evaluation, and there would be public involvement before making a final decision.

Part One—Mason Neck Refuge CCP Alternatives

Actions Common to All Mason Neck Refuge CCP Alternatives

There are some actions we propose to undertake in managing Mason Neck Refuge over the next 15 years, regardless of which CCP alternative we select. Some of those actions are required by law or policy, or represent actions that have undergone previous NEPA analysis, public review, agency review, and approval. Others may be administrative actions that do not necessarily require public review, but we want to highlight in this public document.

It is important here to reemphasize that CCPs provide long-term guidance for management decisions through goals, objectives and strategies. They represent our best estimate of future needs. This CCP details program levels and activities that are substantially above current budget allocations and, as such, should be viewed as strategic in nature. Our budgets are determined annually by Congress, and distributed through our Washington and Regional offices, before arriving at field stations. In summary, the actions proposed herein represent our strategic vision for the future. Final CCPs do not constitute a Service commitment for staffing increases, or funding for operations, maintenance, or future land acquisition. Implementation must be adjusted annually given the reality of budgets, staffing and unforeseen critical priorities.

All of the following actions, which we discuss in more detail below, are current practices or policies that would continue in some form under all alternatives, though they may differ in details under each alternative:

- Using an adaptive management approach, where appropriate
- Consolidating and improving refuge lands and facilities
- Refuge staffing and administration
- Coordinating with refuge partners, Friends of Potomac River Refuges, and the Mason Neck Refuge community
- Protecting Federal-listed species
- Managing invasive plants
- Controlling pest plants and animals
- Monitoring and abating wildlife diseases
- Managing forest health and condition
- Supporting research and investigations
- Developing refuge step-down plans
- Distributing Refuge Revenue Sharing payments
- Protecting cultural resources
- Supporting wildlife-dependent recreational uses
- Continuing a fishing closure at Mason Neck Refuge
- Conducting appropriateness and compatibility reviews of refuge uses

Using an Adaptive Management Approach

All of the alternatives will employ an adaptive management approach for improving resource management by learning from management outcomes. In 2007, Secretary of Interior Kempthorne issued Secretarial Order No. 3270 to provide guidance on policy and procedures for implementing adaptive management in departmental agencies. In response to that order, an intradepartmental working group developed a technical guidebook to assist managers and practitioners: "Adaptive Management: The U.S. Department of Interior, Technical Guide." It defines adaptive management, the conditions under which we should consider it, the process for implementing it in a structured framework, and evaluating its effectiveness (Williams et al., 2007). You may view the technical guidebook at *http://www.doi.gov/initiatives/AdaptiveManagement/documents.html.*

The guidebook provides the following operational definition for adaptive management:

"Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increase scientific knowledge, and reduces tensions among stakeholders."

This definition gives special emphasis to the uncertainty about management impacts, iterative learning to reduce uncertainty, and improved management as a result of learning. At the refuge level, our monitoring of management actions, outcomes and key resources will be very important to implementing an adaptive management process. Our invasive species and integrated pest management activities are examples of refuge programs or activities where an adaptive management approach may be implemented to insure we are protecting the health and integrity of our habitats. Responding to climate change impacts will also require an adaptive management approach because of the uncertainty as to how, when, and where habitats and species will respond to those impacts.

The refuge manager will be responsible for changing management actions and strategies if they do not produce the desired conditions. Significant changes from what we present in our final CCP may warrant additional NEPA analysis and public comment. Minor changes will not, but we will document them in our project evaluation or annual reports. Implementing an adaptive management approach supports all the goals of the refuge.

Consolidating and Improving Refuge Lands and Facilities

Consolidating Refuge Lands

We would continue discussions with the Northern Virginia Regional Park Authority (NVRPA), Fairfax County officials, and elected officials, about options for consolidating Service fee ownership of refuge lands. Presently, 789 of the refuge's 2,277 acres are under a 60-year lease agreement with NVRPA executed in 1982; 33 years remain on that lease which will expire in 2042. Acquiring this land in fee would provide the Service maximum management flexibility. This would be especially desirable when implementing forest management or wetlands restoration.

Building a New Refuge Headquarters/Visitor Center

We would continue to pursue funding to build a new refuge complex headquarters and visitor center on Occoquan Bay Refuge. Staff, equipment, interpretive

materials, and exhibits at this facility would support the outreach, interpretive, and educational objectives identified for Mason Neck Refuge. We have completed a separate environmental assessment (EA) for locating and developing this facility (USFWS, 2009a). A copy is available from refuge headquarters.

Maintaining Visitor Facilities
We would continue to make incremental progress in maintaining and upgrading existing visitor services facilities such as interpretive and informational signs and parking areas. We would also continue to identify and remove those structures that have no useful purpose or that pose safety hazards. Our objective would be to continue to maintain our facilities to Service standards to keep them safe, functional, and attractive.

Refuge Staffing and Administration

Below we describe activities related to staffing, administration, and operations that are shared among the alternatives. Implementing these activities supports all our refuge goals.

Permanent Staffing and Operational Budgets
Our objective would continue to be to sustain annual funding and staffing levels that allow us to achieve our refuge purposes, as interpreted by the goals, objectives, and strategies. Many of our most visible projects since refuge establishment were achieved through special project or "earmarked" funds that typically have a 1- to 2-year duration. While these funds are very important to us, they are limited in their flexibility since they typically cannot be used for any other priority project that may arise.

In response to Refuge System operational funding declines nationwide, a Regional Work Force Plan was developed in fiscal year 2006 to support a new base budget approach. The goal was to have a maximum of 75 percent of a refuge complex's budget cover salaries and fixed costs, while the remaining 25 percent or more will be operations dollars. The intent of this strategy is to improve the refuge manager's capability to do the highest priority project work and not have the vast majority of a refuge's budget tied up in inflexible, fixed costs. Unfortunately, in a stable or declining budget environment, this may also have implications on the level of permanent staffing.

Under all alternatives, and within the guidelines of the new base budget approach, we would maintain, at a minimum, the six current full-time staff positions for the Refuge Complex, which include a refuge manager, assistant refuge manager, visitor services specialist, law enforcement officer, administrative assistant, and maintenance worker. Staff would continue to be shared within the Refuge Complex and would be assigned tasks at any of the three refuges based on the refuge manager's determination of how resources should be distributed to accomplish priorities. Alternatives B and C propose an increase in staff based on the national staffing model developed for refuges by the Service in 2008. See our discussion on this under "Actions Common to Alternatives B and C only."

Refuge Operating Hours
We would continue to open the refuge for public use year-round during refuge hours of operation. These hours of operation are typically 7am to 7pm from April 1-September 30 and 7am to 5pm from October 1-March 31. A temporary closure is implemented during scheduled refuge hunt dates. However, the refuge manager does have the authority to issue a special use permit to allow access outside those periods. For example, we may permit access for research personnel or hunters at different times, or allow organized groups to conduct nocturnal activities, such as wildlife observation, and educational and interpretive programs. To insure visitor safety and protect refuge resources, the refuge manager also has the authority to close the refuge at any time.

Coordinating with Partners, Friends of Potomac River Refuges, and the Mason Neck Peninsula Community

Partners

We would continue to maintain active involvement in the Mason Neck Land Managers Group (Managers Group). The Managers Group is a partnership among all public land management agencies on the Mason Neck Peninsula designed to achieve habitat and public use management objectives that benefit public lands beyond the refuge boundary.

As part of the Managers Group, we would continue to

- Communicate and coordinate regularly with the other agencies: Mason Neck State Park, BLM, Gunston Hall Plantation, and Pohick Bay Regional Park to discuss common goals, issues and concerns, share technical information, and identify opportunities for cooperative management
- Rotate responsibility for hosting quarterly managers meetings
- Pursue formal MOU/MOAs with these agencies where warranted to facilitate sharing of resources
- Maintain the existing MOU with BLM to share in law enforcement

In addition to the Managers Group, we would continue to evaluate opportunities for new partnerships with conservation organizations, educators, research and academic institutions, and other State and Federal agencies who share similar missions and goals. We will develop formal MOU/MOAs, or cooperative agreements, as warranted to facilitate the sharing of resources and implementation of programs.

With existing and future partners, we will make a greater effort to highlight our programs, opportunities and successes through use of media links (e.g., website), development of quality outreach materials with clear and consistent messages.

Friends of Potomac River Refuges

We would continue to look for opportunities to enhance our relationship with the Friends of Potomac River Refuges. We will also encourage them to work with other local citizens groups as an extension of our community outreach program. We will work closely with the Friends Group to

- Implement their strategic plan.
- Conduct monthly information and strategy meetings.
- Contribute information to their newsletter and website.
- Support their efforts at sponsoring community events and programs.

Protecting Federal-listed and Recently De-listed Species

The bald eagle was removed from the Federal list of threatened and endangered species in 2007. However, we would continue to protect nesting bald eagles and their habitat on the refuge under all alternatives because their protection was the primary purpose for establishing the refuge. Furthermore, the bald eagle remains a State-listed threatened species in Virginia and continues to be protected federally under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. There are currently three nesting bald eagle pairs on the refuge, and we will continue to monitor the nests and breeding activities and prohibit the public from disturbing them.

The Service has identified two Federal-listed plants in Fairfax County which have not been documented but may be present on Mason Neck Refuge: sensitive joint-vetch (threatened) and small whorled pogonia (threatened). We would continue to survey for these plants wherever we propose any ground disturbing activities on the refuge. If located, we would work with the respective species' Recovery Team and other experts to develop plans to protect them.

Managing Invasive Plants

The establishment and spread of invasive plants is a significant problem that reaches across all habitat types. For the purposes of this discussion, we use the definition of invasive species contained in the Service Manual (620 FW 1.4E): "Invasive species are alien species whose introduction does or is likely to cause economic or environmental harm, or harm to human health. Alien species, or non-indigenous species, are species that are not native to a particular ecosystem. We are prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere."

The unchecked spread of invasive plants threatens the biological diversity, integrity and environmental health of all refuge habitats. In many cases, these plants have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. Over the past several decades, government agencies, conservation organizations, and the general public have become more acutely aware of the negative effects of invasive species. There are many plans, strategies, and initiatives targeted toward more effective management of invasive species, including *The National Strategy for Management of Invasive Species* for the National Wildlife Refuge System (2003), *Silent Invasion—A Call to Action* by the National Wildlife Refuge Association (2002), and *Plant Invaders of Mid-Atlantic Natural Areas* by the Service and the National Park Service (2002). New information and updates on recent advances in control techniques are continually provided through the Refuge System biological discussion database and relevant workshops. There are also more funding sources, both within the Service's budget and through competitive grants, to conduct inventories and control programs.

Guidance for managing invasive species on refuges is found in the Service Manual (620 FW 1.7G). These actions, as stated in the Service Manual, serve to define our general strategies on the refuge:

1) Manage invasive species to improve or stabilize biotic communities to minimize unacceptable change to ecosystem structure and function and prevent new and expanded infestations of invasive species;

2) Conduct refuge habitat management activities to prevent, control, or eradicate invasive species using techniques described through an Integrated Pest Management Plan, or other similar management plan, which comprehensively evaluates all potential integrated management options, including defining threshold/risk levels that will initiate the implementation of proposed management actions;

3) Evaluate native habitat management activities with respect to their potential to accidentally introduce or increase the spread of invasive species and modify our habitat management operations to prevent increasing invasive species populations;

4) Conduct Refuge Complex integrated pest management planning to address the abilities and limitations of potential techniques including chemical, biological, mechanical, and cultural techniques;

5) Manage invasive species on refuges under the guidance of the National Strategy for Invasive Species Management and within the context of applicable policy;

6) Continue treatment of the most problematic species as funding and staffing permit;

7) Maintain early-detection/early-response readiness regarding new invasions;

8) Remove parent sources of highly invasive species (species that are high seed producers, or vigorous rhizome producers) from along edges of management units.

9) Maintain accessibility to affected areas for control and monitoring; and,

10) Continue and increase efforts to involve the community in promoting awareness of invasive species issues, and to seek assistance for control programs on and off the refuge.

In addition to these general strategies, we would continue to refine our control program to address the most critical problems first. Further, our priorities may be adjusted to reflect changes in Regional Service priorities, and/or based on new information or resource availability. We will identify those priorities and treatment needs in an Integrated Pest Management (IPM) Plan for the Refuge Complex that will specify the tools, procedures, and mitigation measures we will use to address invasive plant problems on all three refuges. Until the plan is finalized, we will track the spread of invasive plants on the refuges and address their control as warranted. Currently, our particular concern on Mason Neck Refuge is the spread of mile-a-minute and Japanese stiltgrass. Other problem plants we are tracking include beefsteak plant, tree-of-heaven, Japanese barberry, Japanese honeysuckle, and Japanese wisteria.

We would continue to treat invasive plants as needed using mechanical (e.g. mowing or trimming) and cultural (e.g. hand-pulling) methods, as well as herbicides. Only herbicides approved by the Regional Contaminant Coordinator will be used, and only in accordance with approved rate and timing of application. Consideration of impacts on target and non-target species is part of the approval process. The extent and frequency of approved herbicide use would depend on funding.

Controlling Pest Animals

At times, native plants and animals interfere with management objectives. The Refuge Manual (7 RM 14.4A) defines a pest as "Any terrestrial or aquatic plant or animal which interferes, or threatens to interfere, at an unacceptable level, with the attainment of refuge objectives or which poses a threat to human health." That definition could include the invasive species defined above, but in this section, we describe some situations involving native species and under what conditions we would initiate control.

In controlling pests, whether invasive or native species, we would continue to use an integrated approach. The Refuge Manual (7 RM 14.4C) defines integrated pest management as "a dynamic approach to pest management which utilizes a full knowledge of a pest problem through an understanding of the ecology of the pest and ecologically related organisms and through continuous monitoring of their populations. Once an acceptable level of pest damage is determined, control programs are carefully designed using a combination of compatible techniques to limit damage to that level."

An integrated approach uses various methods, including natural, biological, cultural, mechanical, and chemical controls. Some examples and potential remedies of pest management follow.

Problem: Deer browsing on newly planted tree seedlings, causing unacceptable levels of mortality

Potential solutions: Use tree shelters or plant clover in advance of tree planting to provide alternative food source. This would be a site-specific strategy to protect a specific valued resource at one location. Our general strategy for keeping deer populations in balance with overall refuge habitat conditions is through public hunting, which we support under all alternatives.

Problem: Beaver girdling large trees adjacent to public use facilities, potentially causing injury to visitors or damaging facilities from falling trees and branches

Potential solutions: Wrap trees with hardware cloth to prevent girdling. Temporarily employ local trappers to remove individuals from the population from selected locations. Remove dead trees before they fall. Also, see discussion below about furbearers and the discussion on general strategies.

Problem: Beaver damming and flooding creeks or other drainage areas, killing native trees or flooding roads, preventing access or threatening public safety, and altering tidal flow

Potential solutions: Remove individual problem beavers by trapping and shooting.

Problem: Mute swans are increasing in numbers and using protected wetland areas.

Potential solution: Work with Federal and State partners (VDGIF) on the capture and removal of mute swans. The Service goal is zero productivity for mute swan in the Northeast Region, due to the swan's negative impact on native waterfowl and their habitats.

Problem: Resident Canada geese increasing in number and using protected wetland areas and grazing and depositing manure on Little Marsh dike and other grassy areas and on the adjacent Mason Neck State Park.

Potential solution: Work with Federal and State partners (VDGIF) on the capture and removal of resident Canada geese.

Problem: Furbearers, such as raccoons, cause unacceptable levels of predation on nesting birds.

Potential solutions: If nest boxes are in use, construct predator guards. Employ mechanical removal or herbicides on invasive vines, such as honeysuckle, that facilitate climbing access to nests. Use a State-licensed trapper to remove individuals from the population in selected areas, if necessary.

We do not intend to initiate a public or recreational trapping program at this time. Trapping is considered a commercial activity and must meet a higher standard of compatibility than priority wildlife-dependent public recreational uses or other non-commercial uses. We will reconsider our position if future situations arise in which predation, habitat loss, or disease is severe, and we determine public trapping to be an effective, essential element in managing them. Until that is necessary, we will only use trapping on a case-by-case basis to help alleviate a particular problem. Trapping would only be conducted by refuge staff, their agents or contractors, to achieve a specific management objective. As such, it would be considered a management or administrative activity and not subject to compatibility review.

We would continue to use the following general strategies in pest management:

1) Determine the need for site-specific control based on the potential to affect our management objectives for a given area. Although we will employ an adaptive management strategy, we also expect the lethal control or removal of individual animals to be the exception rather than the rule. Unfortunately, to establish general thresholds for that action is difficult. Instead, we will determine our solution by each site. For example, in some areas, beaver activity (e.g., ponding, flooding, tree-girdling, tree-falling, etc.) enhances our management objectives for wildlife and habitats. In other areas, extensive beaver activity (e.g., tree-felling, trees dying from flooding, blockage of water control structures, etc.), could begin to affect habitat significantly for migratory birds and other sensitive species. In summary, we will base our beaver management actions on the extent and impact of damage, and not on the number of beavers present. We will focus on how they affect sensitive resources, neighboring marshes and fields, refuge infrastructure, and accessibility. When non-lethal techniques are not feasible, or they are no longer a viable remedy, we will consider targeted trapping or shooting by refuge staff, their agent or contractor.

2) Employ integrated pest management techniques, including those described in the examples above, when a species is having a significant impact on an area resulting in major habitat replacement and loss of valuable canopy trees (such as oaks).

3) Monitor results to ensure that pests do not exceed acceptable levels.

Monitoring and Abating Wildlife Diseases

The Service Manual chapter on Disease Prevention and Control is not yet published. Until it is, we derive guidance on this topic from the Refuge Manual and specific directives from the Director of the Fish and Wildlife Service or the Secretary of the Interior. Refuge Manual 7-RM-17.3 lists three objectives for disease prevention and control:

1) To manage wildlife populations and habitats so the likelihood of disease contraction and contagion are minimized;

2) To provide for early detection and identification of disease mortality when it occurs; and

3) To minimize losses of wildlife from disease outbreaks.

These objectives were published in 1982. Since that time, in addition to diseases that cause serious mortality among wildlife, significant attention has been given to those diseases that are transmitted through wildlife to humans. Lyme disease, transmitted by ticks, and West Nile virus, transmitted by mosquitoes, are examples.

A serious wildlife disease receiving considerable attention worldwide is avian influenza. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, all refuges were instructed to prepare an Avian Influenza Surveillance and Contingency Plan. The plan covering the Refuge Complex was approved in July 2006 (USFWS, 2007a). It discusses methods for dealing with this disease should it ever be identified on the refuge.

Another disease of significant concern to both the Service and VDGIF is chronic wasting disease (CWD). It attacks the brain and spinal cord of deer, elk and moose and is typically fatal. While the exact cause is unknown, it is believed to be caused by a prion, an altered protein that causes other normal proteins to change and cause sponge-like holes in the brain. CWD was first identified in

the 1960s in a Colorado research facility and since that time it has been found in Wisconsin, Wyoming, Nebraska, New Mexico, South Dakota, Illinois, Utah, Kansas, Minnesota, Montana, Oklahoma, New York, West Virginia and Canada. Prion diseases, like CWD, do not move easily between species. There is no scientific evidence that CWD has been transmitted to animals other than deer, elk and moose. The VDGIF is conducting active surveillance for (CWD) during deer hunting seasons. To establish whether CWD occurs in Virginia, VDGIF commenced statewide CWD surveillance in 2002. Deer have been sampled from every county in the Commonwealth, and fortunately CWD has not been detected (VDGIF, 2007). We developed a CWD plan for the Refuge Complex in 2006.

Managing Forest Health and Condition

In addition to wildlife diseases, we would continue to be attentive to diseases and insect pests that affect forest health and condition. Since we place high value on hardwood forests on the refuge, diseases and insects that affect oaks are of special concern. Oaks in the U.S. are affected by more than 80 documented insects and diseases, with escalating international trade likely to introduce new pests. Impacts of these pests range from minor defoliation to rapid mortality. In some years, pests cause the loss of a major portion of the acorn crop, impeding oak regeneration. A few pests have altered, or may alter, eastern U.S. oak forests on a broad scale. For example, the spread of the introduced gypsy moth, a defoliator, has been aided in the last few decades by the accidental transport of egg masses by humans.

General strategies for pest and disease prevention and control include:

1) Continue to conduct pest and disease surveillance in conjunction with other field work;

2) Monitor forests and other habitats for indicators of increased occurrence of pests or disease. For example, note changes in flowering or fruiting phenology, physical damage, decay, weakening, sudden death, particularly of canopy and source trees of major host species, and note changes in wildlife use of habitats such as the absence of breeding birds that used to be seen regularly

3) Cooperate with Federal and State agencies, particularly VDGIF and USDA-Forest Service (USDA-FS) in conducting surveillance, providing access for sampling, and following protocols in the event of an outbreak;

4) Follow protocols outlined in national, State, and refuge-specific disease prevention and control plans.

In 2009, the Virginia Department of Forestry (VDF) completed a Forest Health and Condition Inventory and Assessment of Mason Neck Refuge. Overall, they determined that the Mason Neck Refuge's hardwood forest was unhealthy, suffering from a lack of regeneration, missing an understory of shrubs and herbaceous plants, and was considerably "overstocked." The lack of hardwood regeneration, shrub layer, and herbaceous plants is likely due to overbrowsing from high deer populations. The VDF report included recommendations for improving forest health and habitat quality for bald eagles and forest interior dependent birds. Specific recommendations we plan to adopt are highlighted as strategies under each of the alternatives.

Supporting Research and Investigations

Guidance on conducting and facilitating research and investigations on refuges is found in the Refuge Manual and the Service Manual. In 1982, the Service published three objectives for supporting research on units of the Refuge System in the Refuge Manual (4 RM 6.2):

1) To promote new information and improve the basis for, and quality of, refuge and other Service management decisions;

2) To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general; and

3) To provide the opportunity for students and others to learn the principles of field research.

In 2006, the Service Manual (603 FW 1.10D (4)) provided supplemental guidance in terms of the appropriateness of research on refuges, as follows: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research."

All research conducted on the refuge by others must be determined in writing to be both appropriate and compatible before a special use permit is issued to allow the activity. As noted in chapter 2, "Affected Environment," we have found several research projects to be appropriate and compatible. We expect that additional opportunities to conduct research on the refuge will arise in the future. In making determinations on the appropriateness and compatibility of future research proposals, we will follow guidance in the Refuge and Service Manuals, and will employ the following general strategies:

- Seek qualified researchers and funding to help answer refuge-specific management questions;
- Participate in appropriate multi-refuge studies conducted in partnership with the United States Geological Survey;
- Facilitate appropriate and compatible research by providing temporary housing and equipment, if available, for persons conducting field work; and,
- Pursue peer-reviewed publications of research, and/or insure the Service is acknowledged as a contributor in research conducted on the refuge by others.

Generally, we will approve permits for research projects that provide a direct benefit to the refuge or that will strengthen our decisions on managing natural resources for biological or public use programs on the refuge. The refuge manager also may consider requests that do not relate directly to refuge objectives, but instead relate to the protection or enhancement of native species and biological diversity in the region and support the goals of ecoregional conservation teams, such as the Atlantic Coast Joint Venture.

All researchers will be required to submit detailed research proposals following the guidelines established by Service policy and refuge staff. Special use permits will also identify the schedules for progress reports, the criteria for determining when a project should cease, and the requirements for publication or other interim and final reports. All publications will acknowledge the Service and the role of Service staff as key partners in funding and/or operations. We will ask our refuge biologists, other divisions of the Service, USGS, select universities or recognized experts, and the VDGIF to peer review and comment on research proposals and draft publications, and will share research results internally, with these reviewers, and other conservation agencies and organizations. To the extent practicable, and given the publication type, all research deliverables will conform to Service graphic standards.

Some projects, such as depredation and banding studies, will require additional Service permits. The refuge manager will not approve those research projects until all required permits are received and the consultation requirements under the Endangered Species Act have been met.

Developing Refuge Step-down Plans

Service planning policy identifies 25 step-down plans that may be applicable on any given refuge. We have identified those that are most relevant to this planning process, and have prioritized their completion if they are not already developed. Plans will be modified and updated as new information is obtained so we can continue to keep them relevant. All plans completed are incorporated by reference and their implementation assumed in this draft CCP/EA. Completion of step-down plans supports all refuge goals.

Refuge Complex-wide Plans
We would continue with Refuge Complex step-down plans according to the following schedule, with details on specific refuges incorporated therein:

- Chronic Wasting Disease Plan (completed 2006)
- Avian Influenza Plan (completed 2006)
- Law Enforcement Plan (in preparation; high priority)
- Safety Plan (updated annually)
- Emergency Action Plan (updated annually)
- Continuity of Operations Plan (updated annually)
- Hazard Communications Plan (updated annually)
- Hurricane Plan (updated annually)
- Fire Prevention Plan (updated annually)
- Integrated Pest Management Plan (moderate priority)

Refuge-specific Plans
The following are refuge-specific plans developed to address the specific conditions and requirements that pertain to Mason Neck Refuge. The priorities for completing the refuge plans are noted below.

- Fire Management Plan (completed in 2004; planned for 2011 update)
- Habitat Management Plan (HMP) (highest priority; to be completed after CCP approval)
- Visitor Services Plan (VSP) (high priority)
- Inventory and Monitoring Plan (IMP) (moderate priority; dependent on completing HMP)
- Sign Plan (moderate priority)

Distributing Refuge Revenue Sharing Payments

As described in chapter 2, we pay Fairfax County Refuge Revenue Sharing Payments based on the acreage and the appraised value of Service fee-owned refuge lands. These annual payments are calculated by formula determined by, and with funds appropriated by, Congress and authorized by the Refuge Revenue Sharing Act (16 U.S.C. 715s). We would continue those payments in accordance with the law, commensurate with changes in the appraised market value of refuge lands, or new appropriation levels dictated by Congress.

Protecting Cultural Resources

As a Federal land management agency, we are entrusted with the responsibility to locate and protect cultural resources, including archaeological sites and historic structures that are eligible for the National Register of Historic Places. This applies not only to resources that are located on refuge lands, but also those

on lands affected by refuge activities, as well as any museum properties. As described in chapter 2, there are numerous recorded archeological sites within the refuge area. Considering the refuge's location on the tidal Potomac River, it is likely that additional sites of various periods will be identified in the future. Appendix F includes an overview of refuge cultural resources.

We would conduct an evaluation of the potential for our projects to impact archeological and historical resources, and would consult with our Regional Archeologist and Virginia SHPO as appropriate. This will be especially important for those projects that include moving or displacing soil, as preservation in place is our preferred treatment for archaeological sites. A pre-project evaluation of activities will ensure we comply with Section 106 of the National Historic Preservation Act, regardless of the alternative implemented. That compliance may require any or all of the following: a State Historic Preservation Records survey, literature review, or field survey. In addition to any surveys and reviews, we will seek to minimize adverse impacts to eligible archaeological sites by limiting public access and through monitoring by law enforcement officials.

We also plan to work with State and local historical societies and preservation offices to interpret cultural resources on the refuge and to explain the importance of protection and preservation of those resources. Additional projects are identified under each alternative.

Supporting Wildlife-Dependent Recreational Uses

The 1997 Refuge Improvement Act designated six wildlife-dependent priority public uses on National Wildlife Refuges: hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation. Per the General Guidelines for Wildlife-Dependent Recreation, Fish and Wildlife Service Manual (605 FW 1), we will strive to ensure any wildlife-dependent recreation program:

1) Promotes safety of participants, other visitors, and facilities

2) Promotes compliance with applicable laws and regulations and responsible behavior

3) Minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan

4) Minimizes or eliminates conflicts with other compatible wildlife-dependent recreation

5) Minimizes conflicts with neighboring landowners

6) Promotes accessibility and availability to a broad spectrum of the American people

7) Promotes resource stewardship and conservation

8) Promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources

9) Provides reliable/reasonable opportunities to experience wildlife

10) Uses facilities that are accessible to people and blend into the natural setting

11) Uses visitor satisfaction to help define and evaluate programs

In 2005, the Northeast Regional Visitor Services Review Team identified priority wildlife-dependent public use programs of emphasis for each refuge. The two programs identified for this refuge are: wildlife observation and interpretation. This determination was based on careful consideration of the refuge's natural resources, existing staff, operational funds, existing and potential facilities, and which programs we would be most effective in providing "quality" opportunities for visitors. While all of the priority public uses are important, and all but fishing are offered on this refuge (see discussion below), wildlife observation and interpretation will receive greater emphasis when prioritizing projects and the distribution of refuge resources. As always, we look to our conservation partners, as well as the Friends of Potomac River Refuges and volunteers to develop and assist with all refuge public use programs.

Continuing a Fishing Closure at Mason Neck Refuge

Mason Neck Refuge has never been open to fishing and a closure to this use would be maintained under all alternatives. There are several reasons for this. We are concerned that anglers walking the shoreline have the potential to disturb nesting and wintering bald eagles, waterbirds, and waterfowl. We are also concerned with trampling of sensitive tidal marsh vegetation, and contributing to shoreline erosion. There are also areas on the shoreline with high, eroding banks where safety is a concern. In summary, there are no areas along the refuge shoreline where we could offer a fishing opportunity and not be concerned with resource damage, wildlife disturbance, or safety. We would continue to direct people to the adjacent State Park for fishing.

Conducting Appropriateness and Compatibility Determinations

Chapter 1 describes the requirements for appropriateness and compatibility determinations. Appendix B includes draft appropriateness and compatibility determinations to support the activities in alternative B, the Service-preferred alternative. Our final CCP will include the approved findings of appropriateness and compatibility determinations for the alternative selected. We will only allow activities determined appropriate and compatible to meet or facilitate refuge purposes, goals, and objectives.

Activities Not Allowed

We have received requests for non-priority, non-wildlife dependent activities that have never been allowed on this refuge. Activities evaluated by the refuge manager and determined not to be appropriate on refuge lands include: taking of native plants, berry picking and mushroom harvesting, jogging, horseback riding, picnicking, biking on other than designated bike routes, swimming and sunbathing, public trails terminating at refuge trailheads, non-wildlife-dependent group gatherings (e.g. weddings, family reunions, other similar parties) and geo-caching (a "treasure-hunting" game using GPS locators). Appendix B documents the refuge manager's decision on their appropriateness. Most of these activities are sufficiently provided elsewhere nearby on other ownerships, so the lack of access on the refuge does not eliminate the opportunity in the area. According to Service policy 603 FW 1, if the refuge manager determines a use is not appropriate, it can be denied without determining compatibility.

Non-Priority Activities Allowed

In addition to the five priority recreational and educational uses we allow, we have determined that several other activities are appropriate and compatible on refuge lands under certain circumstances under all alternatives. They include: dog walking on leash only, research, and certain outdoor events (including the Eagle Run and Hartwell Festival). These activities are either discussed earlier in this section or described in detail under individual alternative's discussions, and included in appendix B.

Special Use Permits
Special Use Permits may be issued for specialized or unique activities allowed on the refuges. Each activity will be evaluated for their appropriateness and compatibility on a case by case basis as they are requested. These activities could include groups of 10 or more individuals or self-guided groups who wish to host their own wildlife-dependant activities, or research activities. Groups of 10 or more are required to have permission for wildlife observation and photography, environmental education, and interpretation. Each request must be presented in writing with details of who, what, where, when, why, and how the activity will be conducted. Each request has different logistics, and therefore, would be evaluated for impacts on the Refuge mission. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of Refuge regulations, a Special Use Permit (SUP) will be issued outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the SUP.

Actions Common to Alternative B and C Only

Alternatives B and C have two actions in common which are not included under alternative A.

Providing Refuge Housing

We would pursue options for providing refuge staff housing on-site (see map 3.1 on page 3-49 for location). Affordable housing in the area is limited and refuge staff must often travel extended distances to find a reasonable place to live. It has been very challenging to find seasonal or temporary staff under these circumstances. Travel time between the refuges within the Refuge Complex during the workday can also be problematic and inefficient. Currently, due to traffic congestion on US Route 1, refuge staff can spend over one hour commuting between refuges less than 20 miles apart. The resulting travel time between home and work, or between refuges, also decreases the Service's ability to respond to incidents or emergencies. Having housing located near the refuge would:

- Significantly increase resource and visitor protection;
- Provide a Service presence in the area, even when the refuge is closed;
- Promote greater awareness of the refuge and its resources by having an employee in the local community conducting outreach, both planned and opportunistic;
- Provide affordable housing for Service employees; and,
- Provide short-term housing for temporary staff, interns, and employees on detail.

Our provisional location for the housing is on refuge lands adjacent to the entrance road (High Point Road; see map 3.1 on page 3-49) on uplands east of Kane's Creek close to the refuge boundary. Archeological and threatened and endangered species surveys and water percolation tests for a septic system would be conducted before a final location is selected. The building would be a two-story duplex set back from the road so as to be less visible to refuge visitors. It would have a garage and an approximately 50 foot length driveway, and be serviced by well-water and a septic field. Building it would involve disturbance to no more than one acre of land.

Also on refuge lands, we would continue to pursue installing a pad and facilities hook-ups for a recreational vehicle (RV) to be used as seasonal temporary quarters for refuge volunteers. It would be located at the Mason Neck Refuge

maintenance facility, or other feasible location on the refuge where infrastructure could be placed without diminishing resource values or public activities.

Implementing the National Staffing Model

In 2008, the Assistant Director of the Refuge System convened a team to develop a national staffing model that would more effectively represent what is needed to operate and manage the diversity of field stations in the Refuge System. The team was directed to develop a model that would take into account the variety of refuge purposes in the Refuge System; contribute to the Refuge System mission; and, comply with the 1997 Refuge Improvement Act and other laws, regulations and policies. The team was also directed to build-off of information and lessons-learned from previous System-wide staffing modeling efforts.

The model developed considers 15 factors which drive refuge workloads, including consideration of acres under management and the level of that management. For example, such things as the amount of: invasive species management, endangered species management and monitoring, active habitat management and biological monitoring, wilderness management, visitation and visitor services programs, volunteer programming, Friends Group coordination, maintenance and facilities management, aircraft or ocean travel needs, subsistence uses, and law enforcement are factors evaluated. The model identifies a total number of full-time equivalents (FTEs) a refuge should have, but it does not dictate what specific disciplines the positions should be, nor does it determine a priority order for filling them. These more detailed decisions are made by the Regional Director, after advisement from the Assistant Regional Director for the Refuge System and recommendations from respective refuge managers.

The national staffing model recommends 16 positions for the Potomac River Refuge Complex. Under alternative B, the Service-preferred alternative, and alternative C, we have proposed which specific positions are recommended to fill out 16 positions. We present the recommended staff by alternative in appendix E — Staffing Charts. We also identify our recommended priority order for acquiring new staff in appendix C—RONS tables.

Actions Considered, but not Fully Developed

A proposed public trail system is in development on the Mason Neck Peninsula. The proposed plans indicate that part of this trail system would terminate at the trailhead parking area for the Mason Neck Refuge's Joseph V. Gartlan Jr. Great Marsh Trail (Great Marsh Trail). This proposed trail would be multi-use and allow activities prohibited on the Great Marsh Trail such as bike riding and rollerblading. After considering whether to include this action our management alternatives, we are have determined it is not warranted to evaluate this proposal further.

First, some of the uses allowed on the proposed tail are not compatible and would conflict with users on the Great Marsh Trail. Some of the uses on the public trail are not wildlife-dependent uses and are not necessary to support priority public uses on the refuge. User conflicts may also decrease the enjoyment of refuge visitors engaged in wildlife-dependent use of the Great Marsh Trail. We do not feel that terminating a proposed public trail at a refuge trailhead will support any refuge purpose, objective, or goal and will not benefit the natural or cultural resources present on the refuge.

Secondly, it is predicted that some individuals using the public trail system will park in the Great Marsh Trailhead parking lot, thus decreasing the amount of parking available for refuge visitors engaged in priority public uses. This could also result in increased use of other refuge facilities by non-refuge users, such as restrooms and trash receptacles. The refuge would incur the costs of increased maintenance of these facilities. We also expect an increase in instances of

prohibited uses (e.g. bicycling, rollerblading, jogging) on the Great Marsh Trail by visitors that do not differentiate between the refuge trail and the proposed public trail system. These instances would create an increased workload for the Refuge law enforcement officer.

Finally, trail maintenance is a concern. The proposed trail would traverse the border of the refuge and the public would likely assume it is owned and maintained by the refuge. The public would, therefore, expect Refuge staff to deal with trail issues.

Based on these factors, we have decided that the proposal for a trail system to terminate at the Great Marsh Trailhead parking lot does not justify further analysis.

Conducting Additional NEPA Analysis

For all major actions, NEPA requires site-specific analysis and disclosure of their impacts, either in an environmental assessment (EA) or an environmental impact statement (EIS). Most of the major actions proposed in the three alternatives and fully analyzed in this draft CCP/EA are described in enough detail to comply with NEPA, and would not require additional environmental analysis. Although this is not an all-inclusive list, the following project examples fall into this category: biological inventories and monitoring; modifications to our public use programs, including new hunting opportunities, and controlling invasive plants and animal pests. Several actions proposed only under alternatives B and C are additional examples of actions analyzed in enough detail to comply with NEPA in this document: new refuge housing, a recreational vehicle (RV) pad for trailer parking, new trails on existing roadbeds, and a new youth turkey hunt program.

Although we analyze herein the impacts of the management alternatives we have developed, additional NEPA analysis will be necessary for certain types of actions even once the CCP is adopted. Where decisions have not been made in this CCP, but must be made later, we analyze the impacts of the possible range of alternatives herein, but may need to supplement this analysis later. An example of this is our proposal under Alternatives B and C to design and construct new breakwaters or other major construction projects to protect the shoreline at Mason Neck Refuge: we analyze the impacts of such projects at a general level herein, but this analysis will have to be supplemented before a final decision on whether to go forward with a particular design is reached. Similarly, if the VDF forest health and condition inventory and assessment recommend extensive forest management activities unforeseen by Refuge staff, adoption of such recommendations would require additional analysis. In each case these are management actions whose precise details and therefore consequences cannot be known by the FWS at this time.

Green heron

Eugene Hester/USFWS

Mason Neck Refuge Alternative A—Current Management

Introduction

Alternative A provides the baseline for comparing alternatives B and C. It assumes that our management of the refuge would continue its current program activities and emphases. We would continue to focus on protecting Federal trust wildlife species and their habitat and maintain current opportunities for public use, without significant improvements or new programs.

Habitat Management

Alternative A would continue our management to protect key Federal trust wildlife species and their habitat, most notably, bald eagles, great blue heron and other waterbirds, and waterfowl. We would continue to prohibit public access to nesting areas that would disturb bald eagles and great blue heron. We would also continue current efforts to control invasive plants, and injurious or exotic species on the refuge. Biological program inventory and monitoring efforts would continue to be those primarily conducted by VDGIF and other partners. We would permit compatible research projects requested by other entities on refuge lands, but would not directly support them.

Visitor Services and Outreach

We would continue our current wildlife observation, photography and interpretation programs by maintaining the Joseph V. Gartlan, Jr. Great Marsh (Great Marsh) and Woodmarsh Trails, and their respective observation platforms and interpretive signs. We would continue to work cooperatively with Mason Neck State Park to maintain the High Point multiple use trail where it crosses the refuge. The primary outreach activity would continue to be our annual Elizabeth Hartwell Eagle Festival Day event.

Refuge Administration

Mason Neck Refuge would be managed by the current six person permanent Refuge Complex staff. Staff hours spent administering this refuge and working on its projects would continue to be based on project priority within the Refuge Complex. In 2007-2008 approximately 30 percent of staff time was spent this refuge.

Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities including species of conservation concern.**

Objective 1.1 Mature Hardwood-mixed Forest—Bald Eagles. Continue to monitor breeding bald eagle activity on the refuge, and protect nesting pairs from human disturbance.

Rationale
See rationale for alternative B, goal 1, objective 1.1.

Strategies
Continue to

- Protect all known active nest sites from human disturbance by restricting public access during sensitive nesting periods. The size of closed area depends on topography, vegetation, and sight distance
- Post trail closures and/or warning signs at appropriate, visible locations to explain to visitors the restriction

- Cooperate with VDGIF and Mason Neck State Park staff in monitoring bald eagle nesting activity
- Utilize refuge law enforcement officer to conduct outreach and enforce restrictions

Objective 1.2 Mature Hardwood-mixed Forest—Migrating Forest Dependent Birds

Protect and manage a healthy contiguous mature hardwood-mixed forest on 1,883 acres benefiting forest dependent migrating birds and other native wildlife.

Rationale
See rationale for alternative B, goal 1, objective 1.2.

Strategies
Continue to
- Work with VDGIF to assess deer populations, deer health, and deer impacts on native vegetation.
- Conduct annual deer hunt as a means of keeping deer population in check and prevent deterioration to the forest understory and herbaceous layer.
- Work with USFS to evaluate threat of gypsy moth outbreak and be vigilant for unusual concentrations of pests, pathogens, and invasive plants and respond with respective treatments accordingly. These may include both chemical and mechanical controls (also see objective 1.5 below)
- Treat invasive plants to the extent funding and staffing are available, with priority given to controlling mile-a-minute, Japanese stiltgrass, and beefsteak plant.
  - Treat approximately 1 acre/year of invasive plants on the refuge, using chemical (e.g. glyphosates) and mechanical controls, and hand-pulling, in an effort to reduce their spread
  - Focus treatments along roads and trails or in sensitive resource areas
  - Cooperate with the adjacent State park in treating invasive plants
  - Utilize volunteers, researchers and/or other conservation partners to collect forest resource information of interest to the Service_
- Work with researchers, educators, and/or volunteers on an opportunistic basis to collect resource information on forest dependent wildlife and plants
- Conduct outreach, education, and interpretation with visitors to explain the refuge's importance to the full complement of forest wildlife and plants
- Minimize the potential for disturbance to these habitat features by restricting public access to designated trails only
- Interpret the importance of vernal pools and the other habitat features as important to a wide variety of wildlife in refuge literature and during refuge purposes

Objective 1.3 Heron Rookery

Continue to protect the 61 acres of mature hardwood-mixed forest that supports one of the largest great blue heron breeding colonies in the mid-Atlantic region.

Rationale
See rationale for alternative B, goal 1, objective 1.3.

Strategies
Continue to
- Prohibit public access to Little Marsh and surrounding bluffs and adjacent forest. Both foot and boat access is prohibited.
- Communicate the unique and regional significance of the heron rookery at outreach opportunities such as refuge programs, events, on the website and in other refuge printed information
- Allow volunteer-led efforts to count nest sites
- Use law enforcement officer to conduct outreach and enforce closure area

GOAL 2: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of wetland habitats and shorelines to support native wildlife and plant communities including species of conservation concern.**

Objective 2.1 Great Marsh Management

Continue to protect the 207-acre Great Marsh for waterfowl, wading birds, bald eagles and other native wildlife identified as a conservation concern in the Virginia WAP.

Rationale
See rationale for alternative B, goal 2, objective 2.1.

Strategies
Continue to
- Prohibit public access to Great Marsh. Both foot and boat access is prohibited.
- Communicate the unique and regional significance of the Great Marsh at outreach opportunities such as refuge programs, events, on the website and in other refuge printed information
- Partner with VDGIF to conduct winter waterfowl banding and avian influenza monitoring in this area
- Use law enforcement officer in the field to conduct outreach and enforce closure area

Objective 2.2 Little Marsh Management

Continue to protect the 50-acre Little Marsh impoundment and maintain the 1.5 acre Little Marsh Road impoundment to support wading birds and waterfowl during the breeding season, and fall and spring migrating seasons, while also providing habitats for other species of conservation concern identified in the BCR 30 plan and Virginia WAP.

Rationale
See rationale for alternative B, goal 2, objective 2.2.

Strategies
Continue to
- Prohibit public access to Little Marsh; both foot and boat access is prohibited
- Maintain signs alerting boaters it is prohibited to land on the dike
- Use law enforcement officer to conduct outreach and enforce restrictions
- Adjust water levels to provide great blue heron and other wading birds with better foraging conditions and to control woody vegetation encroachment

- Maintain water control structure in good working condition
- Conduct a slow drawdown of water lasting about 4 weeks in summer to improve foraging habitat for wading birds, particularly great blue heron
- Exclude public from Little Marsh Road to protect sensitive wildlife areas

Objective 2.3 Shoreline Protection

Continue to protect the refuge's 4.4 miles of shoreline and bluffs to maintain refuge integrity and protect refuge habitats.

Rationale
See rationale for alternative B, goal 2, objective 2.4.

Strategies
Continue to
- Work with partners to monitor and maintain the existing approximately 200 feet of refuge shoreline (e.g. breakwater structures)
- Minimize public access to shoreline

Objective 2.4 Aquatic Habitat and Water Quality

Continue to support local, Federal and State partners' efforts to protect and monitor aquatic habitats and water quality to conserve interjurisdictional and Federal trust fisheries in the tidal Potomac River.

Rationale
See rationale for alternative B, goal 2, objective 2.5.

Strategies
Continue to
- Provide assistance to researchers upon request, typically as logistical support, to facilitate their research on fish and other aquatic species in the tidal Potomac River
- Monitor invasive aquatic species and distribution, and implement control measures when funding and staffing allows

GOAL 3: **Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation and wildlife observation.**

Objective 3.1 Deer Hunting

Continue to provide the annual, public, high-quality white-tailed deer hunt program to support deer and forest health and condition objectives.

Rationale
See rationale for alternative B, goal 3, objective 3.1.

Strategies
Continue to
- Cooperate with VDGIF in meeting State deer management plan goals
- Maintain current hunt program;
  - State and local partners involved in hunt administration
  - Incorporate Mason Neck State Park as part of hunt area
  - Target an average of 90-100 deer harvested/year or a number recommended by VDGIF biologists

- Provide technical support for deer hunt programs on other public land management agencies on Mason Neck Peninsula

Objective 3.2 Turkey Hunting

No program

Objective 3.3 Waterfowl Hunting

Continue to work with VDGIF to support a waterfowl hunt in State waters adjacent to the refuge.

Rationale
See rationale for alternative B, goal 3, objective 3.3.

Strategies
Continue to
- Coordinate with VDGIF conservation officer in addressing any waterfowl hunting issues
- Prohibit waterfowl hunting on refuge lands

Objective 3.4 Wildlife Observation and Photography

Continue to maintain current opportunities for wildlife observation and photography at existing trails and parking facilities, observation platforms and photography blinds.

Rationale
See rationale for alternative B, goal 3, objective 3.4.

Strategies
Continue to
- Maintain the two trails entirely on refuge lands: Woodmarsh (2.5 miles) and Joseph V. Gartlan, Jr. Great Marsh (Great Marsh) (0.75 miles) trails
- Cooperate with Mason Neck State Park in maintaining the multi-purpose High Point Trail where it passes through the refuge (3.0 miles total; 0.5 miles on refuge)
- Close portions of the Woodmarsh Trail from December to June to protect nesting bald eagles
- Allow foot travel as the only mode of transportation on Woodmarsh and Great Marsh Trails
- On the High Point multi-purpose trail, continue to allow all forms of pedestrian and bicycling access in coordination with Mason Neck State Park
- Prohibit motorized use and horseback riding on all trails
- Collect monthly visitor use data on the High Point, Great Marsh, and the Woodmarsh Trails

Objective 3.5 Interpretation Program

Continue to maintain current interpretive program to explain to the public the values of refuge wildlife and habitats and cultural resources.

Rationale
See rationale for alternative B, goal 3, objective 3.5.

Strategies
Continue to
- Distribute general refuge brochure and post at kiosks
- Maintain interpretive and other pertinent refuge information at the three kiosks located at the Woodmarsh trailhead, the Woodmarsh trail near Sycamore Road, and the Great Marsh trailhead.
- Install interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities.
- Work with the Mason Neck State Park to support the annual Elizabeth Hartwell Eagle Festival in April, including providing guided refuge tours.
- Coordinate with the National Park Service to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.
- Work with the Mason Neck agencies to complete the joint agency kiosk on Gunston Road near the entrance to the Mason Neck Peninsula to orient visitors and describe the missions of each agency. This kiosk will:
  - Contain a map of the area including agency lands,
  - Provide information about the purposes and management of each agency, recreational opportunities, and regulations for each area

Objective 3.6 Environmental Education Program

Continue to maintain a limited environmental education program.

Rationale
See rationale for alternative B, goal 3, objective 3.6.

Strategies
Continue to
- Allow Thomas Jefferson High School to conduct environmental educational activities along High Point, Anchorage, and Sycamore Roads, including their successive years of study on
  - Vernal pools
  - Deer pellet counts
- Facilitate other environmental education opportunities and programs upon request

GOAL 4:

Enhance efforts to promote awareness, understanding and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.

Objective 4.1 Volunteers

Maintain an active volunteer program.

Rationale
See rationale for alternative B, goal 4, objective 4.1.

Strategies
Continue to
- Enlist the help of volunteers on an opportunistic basis to support refuge programs

- Develop community service projects to support Fairfax County court system
- Have volunteers from the community assist in refuge cleanup activities, special events, routine maintenance of trails, roads, and other areas; invasive plant control; bald eagle and other bird counts
- Develop projects for the Boy Scouts and the Girl Scouts upon request
- Issue the monthly refuge complex volunteers newsletter to identify current and upcoming events
- Develop and implement annual volunteer recruitment, training, and appreciation/recognition events

Objective 4.2 Community Outreach

Continue to inform visitors and local residents about the refuge and its resources at refuge and community events, via the media, and at refuge-hosted programs and projects in order to create an awareness and understanding of how refuge management activities benefit wildlife, wildlife habitat, and the protection of historic and cultural resources.

Rationale
See rationale for alternative B, goal 4, objective 4.2.

Strategies
Continue to
- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities
- Routinely respond to written, telephone, and in-person inquiries from the public.
- Maintain and regularly update contact information for partners, elected officials, the media, and the general public
- Inform refuge neighbors of refuge management activities via website, press stories, and newsletters
- Promote our successes in the local community via refuge and community events, project demonstrations, and media stories
- Utilize volunteers to participate in community events in Fairfax County where effective outreach of refuge programs can occur
- Continue to maintain the refuge website with links to newsletters, the Friends of the Potomac River Refuges, and other pertinent refuge information

Objective 4.3 Partner Outreach

Continue to foster cooperation and communication with other State and Federal agencies, museums, civic organizations, environmental and conservation groups, and other interest groups, such that the Refuge System mission and refuge goals are better understood by all.

Rationale
See rationale in alternative B, goal 4, objective 4.3.

Strategies
Continue to
- Maintain contact list and ensure regular contact with local groups, environmental groups, and other interested parties active in the Mason Neck Refuge area.

Objective 4.4 Elected Official Outreach

Continue to inform elected officials representing the refuge area about refuge management priorities, special events and other activities, on an annual basis or as significant issues arise.

Rationale
See rationale in alternative B, goal 4, objective 4.4.

Strategies
Continue to
- Invite Federal, State, and local elected officials to attend and participate in outreach events held on the refuge

- Provide written or personal briefings for members of Congress, and their staff, as needed or requested, to inform them about important refuge issues

Objective 4.5 Research

Continue to encourage research to provide data to support refuge management decisions or to support regional projects of Service interest.

Rationale
See rationale in alternative B, goal 4, objective 4.5.

Strategies
Continue to
- Support inventories and research led by others, such as the Monitoring Avian Productivity and Survivorship (MAPS) station, that are a priority for the refuge, and compatible with refuge purposes, goals and objectives; use both refuge staff or volunteers as funding allows.

GOAL 5: **Enhance efforts to protect and interpret refuge cultural resources.**

Objective 5.1 Archeological Resources

Continue to protect archaeological resources on the refuge from damage by visitors, from illegal activity, or from environmental factors.

Rationale
See rationale in alternative B, goal 5, objective 5.1.

Strategies
Continue to
- Limit public access to designated trails to keep visitors away from known archeological sites on the refuge

- Coordinate with the Service's Regional Archeologist to determine the level of consultation required in conjunction with refuge projects that have a potential to affect archaeological resources

- Conduct archaeological reviews, surveys, or studies of project areas as needed, or recommended, by the Service's Regional Archeologist
- Monitor known archeological sites for looting and trespass

Objective 5.2 Historical Resources

Continue to protect historical resources on the refuge from damage by visitors, from illegal activity, or from environmental factors.

Rationale
See rationale in alternative B, goal 5, objective 5.2.

Strategies
Continue to
- Limit public access to designated trails to keep visitors away from historic sites on the refuge
- Provide interpretation of historic importance of refuge in refuge brochures and kiosks
- Monitor known historical sites for looting and trespass

Entrance sign at Mason Neck Refuge

Bill Wallen

Mason Neck Refuge Alternative B–Improved Management for Federal Trust Resources (Service-preferred Alternative)

Introduction

Our planning team recommends this alternative to the Regional Director for implementation. We believe it provides the best combination of actions to meet the Refuge System mission and policies, and refuge purposes and goals. It is also the most effective of the alternatives in addressing public issues. We plan to enhance and expand our partnerships to help achieve priority work and obtain the best resource information available. Our management focus would be on those actions that protect and enhance the refuge's tidal marsh and forest habitats, with emphasis on benefiting bald eagles, wading and waterbirds such as great blue heron, forest-dependent migratory songbirds, and waterfowl.

Habitat Management

As noted above, our highest priority is to protect and enhance the diversity, integrity and health of the refuge's Great Marsh and the mature hardwood-mixed forest habitats. We would develop a HMP to outline the detailed, site-specific prescriptions and strategies we intend to employ in those habitats to benefit a broad array of wildlife, including our focal species, amphibians and reptiles, aquatic resources, and other native wildlife of conservation concern. The HMP would also include detailed plans to improve Little Marsh impoundment and other refuge wetlands. We would also improve our program to treat invasive species. Our mapping, inventory and monitoring program of wildlife and habitats would increase to help assist us in measuring our successes.

Visitor Services and Outreach

We would enhance the visitor services provided by improving our infrastructure and the quality of our programs, and offering new opportunities. For example, we would improve our existing parking facilities and trails, and create new trails and observation platforms on Sycamore Road and Treestand Road. These actions would provide additional opportunities for wildlife observation, photography and interpretation. We would also offer a new youth turkey hunt. Our outreach to the local community would improve through increased Service visibility, an improved volunteer program, and enhanced programs and services.

Refuge Administration

We would manage the Refuge Complex from new headquarters on Occoquan Bay Refuge. The approved Refuge Complex staffing chart identifies a total of 16 positions which is an increase of 10 positions from our current staffing levels. We have identified the vacant positions we recommend in this CCP which we believe are key to implementing this plan's goals and objectives. They include wildlife biologists, maintenance, law enforcement and visitor services staff.

USFWS

Forested habitat on Mason Neck refuge

Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities including species of conservation concern.**

Objective 1.1 Mature Hardwood-mixed Forest

Bald Eagles. Actively manage 1,200 acres of forest to provide bald eagle nest and roost sites (for a minimum of 3 pairs of eagles). Protect all known sites by preventing disturbance using VDGIF and Service recommendations. Provide for potential new nest trees (higher than the surrounding canopy with large, branching limb structure providing easy access and wide views near marshes and rivers).

Rationale

Bald eagles generally nest near coastlines, rivers, large lakes or streams that support an adequate food supply. In forested areas, bald eagles often nest in mature or old-growth trees, selecting the tallest trees with limbs strong enough to support a nest that can weigh more than 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water where the eagles usually forage (USFWS, 2007b). For warmth during the winter, bald eagles sometimes use conifers and floodplains bounded by river bluffs at nighttime or when wind is severe (INHS, 2008).

The Potomac and other major tidal rivers in Virginia also have areas where non-breeding eagles are known to concentrate for roosting and feeding. These areas may be used by non-breeding eagles in both summer and winter. These eagle concentration areas are extremely important because they are used by eagles from throughout the East Coast, as well as resident eagles (USFWS/VDGIF, 2000).

A variety of food sources best satisfies the bald eagles' constant demand (VAFWIS, 2010). The geographic area and season determines the diet. Bald eagles acquire the majority of their food in the shallow waters of low tide. Bald eagles employ a variety of hunting techniques such as striking fish and scavenging carcasses. Infrequently, bald eagles pursue waterfowl in the air, particularly injured birds (INHS, 2008). Brown bullhead *(Ameiurus nebulosus),* chain pickerel (*Esox niger)*, white sucker *(Catostomus commersoni)*, white perch *(Morone americana),* and smallmouth bass *(Micropterus dolomieui)* are major food sources for inland nesting bald eagles. However, marine mainland bald eagles predominately eat alewife, blueback herring, and American eel. In the winter, food sources include common goldeneye *(Bucephala clangula)*, bufflehead *(Bucephala albeola)*, and red-breasted merganser (*Mergus serrator)* (VAFWIS, 2010).

In this region, eagle pairs build their nests from October through January, lay eggs from January to April, rear their young from February through June, and fledge their young from May to August. During this entire period, eagle reproductive success may be adversely affected by human disturbance. If agitated by human activities, eagles may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests can jeopardize eggs or young. Depending on weather conditions, eggs may overheat or cool too much and fail to hatch. Unattended eggs and nestlings are subject to predation. Young nestlings are particularly

vulnerable because they rely on their parents to provide warmth or shade, without which they may die as a result of hypothermia or heat stress. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Older nestlings no longer require constant attention from the adults, but they may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves. Once fledged, juveniles range up to ¼ mile from the nest site, often to a site with minimal human activity. During this period, until about six weeks after departure from the nest, the juveniles still depend on the adults to feed them. (USFWS, 2007b)

This refuge was established in 1969 as the Nation's first refuge dedicated to protecting bald eagle using funds provided under the Endangered Species Act. Eagles nested and wintered on the peninsula as far back as colonial times, but in the 1950's and 1960's they succumbed to development and pesticides. With greater awareness, an increase in their protection both nationally and regionally, and a reduction in pollution, the eagle population has made a recovery. The removal of the bald eagle from the Federal list of endangered and threatened species was predicated on the assumption that they would continue to thrive in areas they presently occupy. Mason Neck Refuge is one location where their protection will remain a priority, regardless of the bird's status, since it supports the principal purpose for which the refuge was established. We will continue to be concerned about their health, productivity, and any disturbance or threats during nesting season. As we noted in chapter 1, the bald eagle continues to be protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA).

The Service developed the National Bald Eagle Management Guidelines (2007) to help minimize impacts to bald eagles, particularly where they may constitute disturbance. To avoid disturbing nesting bald eagles, the guidelines recommend (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. These measures are all in place on the refuge.

With enhanced local and regional support for the existing and proposed strategies identified below, we believe the refuge can make an important contribution to sustaining bald eagle nesting and wintering in the Chesapeake Bay region. Hiring a wildlife biologist would be an important component to accomplishing this objective.

Strategies

Continue to

- Protect all known active nest sites from human disturbance by restricting public access during sensitive nesting periods. The size of closed area depends on topography, vegetation, and sight distance

- Post trail closures and/or warning signs at appropriate, visible locations to explain to visitors the restriction

- Cooperate with VDGIF and Mason Neck State Park staff in monitoring bald eagle nesting activity

- Utilize refuge law enforcement officer to conduct outreach and enforce restrictions

Over the 15 years of CCP implementation:

- Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities

- Work with Service and VDGIF bald eagle experts to define potential nest and roost stands, in addition to those currently used by eagles. Identify possible stand treatments to enhance to both potential and currently used areas; consider such actions as thinning, planting, tree release, and fuel reductions to protect areas from potential wildfires and provide optimum growth for potential nest trees

- Ensure management actions meet or exceed the guidelines for protection and management of eagle sites as identified in the Service's National Bald Eagle Guidelines (2007)

- Develop nest and/or roost site management plans as warranted, prioritizing actions and developing an implementation schedule. Incorporate plans into HMP.

- Create and maintain a GIS database with locations of active and potential nest and roost sites, and any management activities. Annotate database with results of annual surveys.

- Work with VDGIF to conduct mid-summer and mid-winter surveys on the refuge. If funding allows, also conduct nest productivity surveys.

Monitoring Elements

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, or trigger a re-evaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Monitor changing bald eagle roost and nest use and make modifications or repairs as necessary to ensure favorable site conditions. Monitor and control invasive plants, erosion, human disturbance, and other sources of habitat degradation as staff and resources permit to protect the integrity of roost, nest, and concentration areas on refuge property

  - Continue to incorporate this habitat type into ongoing biological surveys, such as habitat-based landbird count surveys, winter and summer bald eagle surveys, migration and winter bird counts, and anuran call counts. Landbird point count habitat classifications in or near roosts would be updated to track changes in habitat relative to bird habitat use.

Objective 1.2 Mature Hardwood-mixed Forest—Migrating Forest Dependent Birds

Protect and manage a healthy contiguous mature hardwood-mixed forest on 1,883 acres benefiting migrating forest dependent birds and other native wildlife. A healthy mature hardwood mixed forest is characterized by:

- Canopy dominant and co-dominant species consisting of oaks, hickory, poplar, maple, sweet gum, black gum, and beech with patches of coniferous trees such as Virginia and loblolly pine.

- Low edge to interior ratio.

- Basal area of < 100 square feet per acre
- Advanced regeneration of canopy trees (1-4 inches DBH) > 300 stems per acre.
- A diverse, native shrub layer represented by low and high bush blueberry, mountain laurel, pawpaw, arrow wood, *Viburnums*, wintergreen, greenbriar, Virginia creeper, partridge berry, Solomon's seal, and wild yam with stem densities of > 1500 per acre.

Rationale
Coastal forests and woodlands within BCR 30 are crucial stopover sites during migration and overwintering for neotropical migrants (Steinkamp, 2008). Within BCR 30, forested upland communities provide habitat for the second highest number of priority bird species in the region (Steinkamp, 2008). Destruction and fragmentation of forests in both breeding and wintering areas are factors in forest bird species declining abundance (Roth et. al., 1996). Many of the declining forest birds are also associated with dense understory conditions created by local disturbance. These conditions have become less common due to a lack of forest management and over-browsing by white-tailed deer (Rich et al., 2004).

Of particular concern in forest habitats in the region is the decline of forest interior dwelling (FIDs) Neotropical migratory birds which require large contiguous forested tracts to maintain viable populations. A minimum habitat patch size is considered to be at least 50 acres in size with 10 or more acres of "forest interior" habitat (i.e., forest greater than 300 feet from the nearest forest edge) (Jones et al., 2000). This minimum habitat patch size, in fact, would only be capable of supporting less area-sensitive FIDs species. The larger the contiguous forest patch, the higher the probability of supporting a diversity of productive breeding pairs.

Among a number of management recommendations for forest birds made by the ACJV in the BCR 30 Plan are:

- Increase/improve active management of forests to improve habitat quality within existing and high priority upland forest (e.g., loss of shrub layer).
- Manage upland forest communities to provide post-fledging habitat (e.g., a habitat mosaic, including shrubby areas and openings; targeted species is the wood thrush).
- Develop and implement programs to control invasive plant species.

In 2009, the Virginia Department of Forestry (VDF) completed an assessment of forest health and condition on the refuge's 1,883 forested acres to inform decision-making in respect to managing bald eagles and neotropical migrants. One of the major threats to forest health and condition is deer overabundance. At Mason Neck Refuge, the lack of midstory woody species diversity is likely due to intense browse pressure of white-tailed deer leading to the wide-spread growth of holly and beech, and shrubs and forbs known to be unpalatable to deer (McGlone and Lasher, 2009). Ensuring deer browse pressure does not significantly impact regeneration of woody species regeneration is essential in the success of the development of Mason Neck Refuge's forest understory. Numerous studies have found when white-tail deer browse pressure is high, it can alter the growth, reproduction (Knight, 2003), diversity (Latham et al., 2005) and ultimately survival of plants within a specific population (Alverson and Waller,1997, Cote et al., 2004). In areas where deer density exceeds 20 deer / square mile, deer

herbivory is related to declines in mid-story bird species (deCalesta, 1994). Other threats include gypsy moth infestations and spread of invasive plant species.

We believe refuge lands make an important contribution to the regional bird populations of FIDs such as wood thrush, Acadian flycatcher, and prothonotary warbler. These species are known to breed on the refuge and are listed as birds of conservation concern by various authorities (appendix A). According to the PIF Area 44 Plan, the BCR 30 plan, and Virginia WAP, other birds species of conservation concern that would benefit from a diverse, mature, mixed-deciduous forest include the eastern wood peewee (*Contopus viren)*, Kentucky warbler (*Oporornis formosus*), cerulean warbler (*Dendroica cerulea*—migrant), Louisiana waterthrush, yellow-throated vireo (*Vireo flavifrons*), whip-poor-will (*Caprimulgus vociferus*), northern flicker (*Colaptes auratus*), scarlet tanager (*Piranga olivacea*), and raptors such as red-shouldered hawk (*Buteo lineatus*), northern saw-whet (*Aegolius acadicus*) and barred owl (*Strix varia*) (Rosenberg et al., 1999).

Hiring a refuge biologist and obtaining increased project funding would allow us to increase inventory, protection, and management of forest dependent species and the habitat features on which they depend.

Strategies
Continue to

- Support partner-led Monitoring Avian Productivity and Survivorship (MAPS) station bird survey work
- Support volunteer-led bird survey work on an opportunistic basis
- Work with VDGIF to assess deer populations and deer impacts on native vegetation.
- Conduct annual deer hunt as a means of keeping deer population in check and prevent deterioration to the forest understory and herbaceous layer.
- Work with USDA-FS to evaluate threat of gypsy moth outbreak
- Be vigilant for unusual concentrations of pests, pathogens, and invasive plants and respond with respective treatments accordingly. These may include both chemical and mechanical controls (also see objective 1.5 below)
- Utilize volunteers, researchers and/or other conservation partners to collect forest resource information of interest to the Service.
- Work with researchers, educators, and/or volunteers on an opportunistic basis to collect resource information on forest dependent wildlife and plants
- Conduct outreach, education, and interpretation with visitors to explain the refuge's importance to the full complement of forest wildlife and plants_
- Minimize the potential for disturbance to unique habitat features by restricting public access to designated trails only
- Interpret the importance of vernal pools and the other habitat features as important to a wide variety of wildlife in refuge literature and during refuge programs.

Over the 15 years of CCP implementation:

- Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities identified under this and all other objectives under goals 1 and 2. For example, these staff would develop HMP, IMP, and IPM plans, coordinate all field survey work, conduct GIS mapping, and coordinate forest management treatments. The senior biologist would also take a lead role in communicating with conservation partners.

- Enlist forest ecologists to conduct and evaluate results of forest health and condition inventory and assessment identifying the most significant threats to sustaining biodiversity, and stand structure, function, and composition. If possible, work with State and Federal agencies, non-governmental conservation organizations, and/or universities with this expertise and that have worked in this region.

- Develop forest prescriptions with consideration of meeting migration requirements for neotropical landbirds and improving forest health; incorporate prescriptions, stand treatments, and implementation schedule in HMP. The range of possible treatments may include prescribed fire, thinnings, plantings, and patch cuts or regeneration cuts to restore/enhance/maintain desired structural and species composition

- Evaluate, with FMP update planned in 2011, needs to reduce fuel loading given urban interface

- Prioritize and implement those treatments that would protect forest health, reduce wildfire safety concerns, and complement bald eagle and migratory bird objectives.

- Maintain all data collected in GIS database

- Implement a sharp-shooter program to supplement deer herd reductions provided by established public hunt, if further reductions in the deer herd are recommended to protect forest health and condition,

- Continue coordination with the USDA Forest Service for gypsy moth or other pest monitoring and control; but, also coordinate with Mason Neck State Park and other adjacent landowners on Mason Neck Peninsula to make control measures more efficient

- Evaluate all management actions to ensure they do not contribute to further forest fragmentation

- Develop a GIS based habitat map and maintain it to current Regional protocols

- Incorporate survey updates and map occurrences of vernal pools and other unique fine-scale habitat features; as sites are identified, determine if there are opportunities to further protect, restore, create, and/or enhance sites to benefit species of conservation concern. Include any plans for management and their priority and schedule in HMP. Incorporate detailed plans for a given year in AHWP.

- Establish priority needs to inventory and/or monitor for forest wildlife and plants of conservation concern. Incorporate planned activities, their priority and schedule in the IMP. Given available funding and staffing, or under partnerships, implement priority activities.

Monitoring Elements:

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native forest species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

- Conduct spring and fall landbird surveys for measuring species composition and relative abundance within the Refuge's mature hardwood-mixed forests.

- To determine the effectiveness of white-tail deer hunting program, evaluate regeneration of native trees, shrubs, and forbs by conducting vegetation surveys to gather information on species composition, abundance, and diversity.

- To maintain desired quality and characteristics of forests for forest interior migratory birds, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than 5 percent of refuge upland acreage, and fundamental objectives are not compromised.

- Monitor presence of coyotes and beaver and work with APHIS or other licensed agent to control these species as necessary to protect public safety and refuge resources.

- Conduct surveys of anurans, to monitor overall diversity and indications of habitat changes that affect local populations or to evaluate for further vernal pool protection or management.

Objective 1.3 Heron Rookery

Actively protect 61 acres of mature hardwood-mixed forests that support one of the largest great blue heron breeding colonies in the Mid-Atlantic region by maintaining a vegetative buffer zone of at least 1,000 feet surrounding the rookery and managing public access to prevent disturbance to roosting and nesting birds.

Rationale

Great blue heron breed across the United States and southern Canada, and more than half of the Atlantic coast's breeding population nest in Chesapeake Bay—predominantly in wetlands. The Chesapeake Bay, coupled with surrounding wetland and forested areas in its river tributaries, provides both the ideal food and habitat necessary for great blue heron survival. Optimal habitat conditions for nesting great blue herons include: 1) close proximity (~ 1.4 miles) to quality foraging habitat, and 2) protection from disturbance and predators (typically islands, trees in swamps, or high branches). Great blue herons nest mostly in trees, but the selection of tree species is highly variable. Great blue heron are present year round in the refuge area; however, the refuge is best known for its large rookery. The Mason Neck Refuge colony supported an estimated 1,400 nests as recently as 2003, although our monitoring has indicated numbers have declined to approximately 800 nests in recent years. We are not sure of the reasons for their decline, and unfortunately, have not had the opportunity to study it further.

In other areas of the Chesapeake Bay watershed, loss of nesting sites and deterioration of water quality and wetland habitat are issues of concern for their survival. Natural generation of new nesting islands, created when old islands and

headlands erode, has decreased due to artificial hardening of shorelines with bulkheads. Poor water quality reduces the amount of large fish and invertebrate species available in wetland areas. If suitable feeding and nesting areas are not maintained, populations of great blue heron will eventually decline. Toxic chemicals that enter the Bay from runoff and industrial discharges pose yet another threat. Although great blue heron currently appear to tolerate low levels of pollutants, these chemicals can move through the food chain, accumulate in the tissues of prey and may eventually cause reproductive failure in the heron.

Care must be taken to preserve nesting sites, as well as feeding areas. Erosion of island nesting areas due to artificial structural development, as well as sea level rise, needs to be carefully monitored. Human disturbance at nesting sites can be a problem and studies recommend that people remain a distance of at least 660 feet to minimize disruption of the heron colony. If heron are disturbed frequently, they may abandon their nests or neglect their young. To avoid this concern, the refuge does not allow public access during the nesting season. Deterioration of submerged aquatic vegetation limits foraging area potential. Wetland foraging sites within 9 to 12 miles of heron colonies need special protection to ensure prey availability.

Recently, the Maryland DNR and the VDGIF have sponsored surveys to monitor populations and annual nesting success of great blue heron. They also monitor colonies of other species of heron and egrets. In early spring before the trees have leaves, aerial surveys are conducted to locate colony sites and count nests. At larger colonies, ground counts are made of active nests.

In order to maintain a relatively stable, substantial population of great blue heron in the Chesapeake Bay watershed, protection of shallow water habitat, feeding areas and rookeries must remain a priority (USFWS–CBFO, 2009). On Mason Neck Refuge, we will continue to protect the rookery from human disturbance, while also monitoring its population and evaluating the habitat condition to determine whether any habitat enhancements are needed.

Strategies

Continue to

- Prohibit public access to Little Marsh and surrounding bluffs and adjacent forest. Both foot and boat access is prohibited.
- Communicate the unique and regional significance of the heron rookery at outreach opportunities such as refuge programs, events, on the website and in other refuge printed information
- Allow volunteer-led efforts to count nest sites
- Use law enforcement officer to conduct outreach and enforce closure area

Over the 15 years of CCP implementation:

- Work with experts to assess and implement measures to increase shoreline and bluff protection to reduce potential loss of nesting trees (also see objective 2.4)
- Using Sea Level Affecting Marshes Model (SLAMM) analysis results, monitor and evaluate conditions in the marshes over the next 15 years with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives where possible and applicable.

- Increase Service visibility and law enforcement presence, increase signage, and other measures as warranted to keep unauthorized persons away from the rookery during breeding season

- Establish a rookery monitoring program with partners and volunteers, and incorporate data in GIS. Monitor such things as nest numbers, locations and shifts in their use between years, impacts to vegetation, and impacts from predators (e.g. raccoons) on the population.

- Consult with waterbird experts to determine whether any vegetation management actions could enhance rookery conditions. Incorporate any plans into HMP.

Monitoring Elements:

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, or trigger a re-evaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Monitor changing heron roost and nest use and make modifications or repairs as necessary to ensure the favorable roosting conditions of the site.

  - Monitor and control invasive plants, erosion, human disturbance, predators and other sources of habitat degradation as staff and resources permit to protect the integrity of roost, nest, and concentration areas on refuge property.

- Continue to incorporate this habitat type into ongoing biological surveys, such as habitat-based landbird count surveys, winter and summer bald eagle surveys, migration and winter bird counts, and anuran call counts. Landbird point count habitat classifications in or near roosts would be updated to track changes in habitat relative to bird habitat use.

GOAL 2: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of wetland habitats and shorelines to support native wildlife and plant communities including species of conservation concern.**

Objective 2.1 Great Marsh Management

Develop an index of ecological integrity for the Great Marsh wetland complex and establish a baseline for future monitoring the biological integrity, diversity, and environmental health of this 207 acre tidal freshwater marsh. Implement strategies, as warranted by monitoring results, to insure that no degradation of integrity occurs, including increases in the extent or abundance of invasive plants. Management will emphasize and reflect the composition, function and diversity of this habitat type, benefiting migrating/wintering waterfowl (e.g. American black ducks, blue and green-winged teal, northern shoveler) and wading birds (great egrets, great blue herons, and green-backed herons).

Rationale

Freshwater tidal marshes were once extensive along the Coastal Plain rivers of the mid-Atlantic region of the United States. After thousands of years of relatively low-impact use by Native Americans and several centuries of intense development by European Americans, freshwater tidal marshes have been reduced to scattered remnants that are now incapable of providing the extent of ecosystem services characteristic of widespread, healthy marsh ecosystems (Odum et al., 1984). Nonetheless, even remnant marshes provide numerous goods and services that benefit human society, including resident and migratory wildlife

habitat, refuge for endangered and other rare species, spawning and nursery grounds for anadromous fish, attenuation of tidal energy, shoreline stabilization, flood control, water quality enhancement, carbon storage, aesthetic enjoyment, and recreational activities (Odum et al., 1984). Consequently, maintenance and enhancement of remaining tidal marsh is imperative both socially and ecologically.

Chronic sea-level rise is advancing the salinity gradient upstream in rivers on the Atlantic Coast, leading to shifts in vegetation composition and the conversion of some tidal freshwater marshes into oligohaline marshes.

Great Marsh, at 207 acres, represents the largest tidal marsh on the refuge and is considered regionally significant due to its size and undisturbed setting. The marsh hosts the largest concentration of wintering waterfowl on the refuge. Species commonly seen include Canada geese, American black ducks, mallards, wood ducks, blue and green winged teal, northern shovelers, tundra swans, and pintails. Marsh birds commonly seen include great blue herons, great egrets, green-backed herons, and pied-billed grebes. Bald eagles have nested on an island in the marsh for over a decade and portions of the Woodmarsh Trail are closed during nesting to prevent nest disturbance. VDGIF annually conducts banding operations in the marsh, primarily for black and wood ducks. They also sample for Avian Influenza.

Strategies

Continue to

- Prohibit public access to Great Marsh; both foot and boat access is prohibited
- Communicate the unique and regional significance of the Great Marsh at outreach opportunities such as refuge programs, events, on the website and in other refuge printed information
- Partner with VDGIF to conduct winter waterfowl banding and avian influenza monitoring in this area
- Use law enforcement officer in the field to conduct outreach and enforce closure area

Over the 15 years of CCP implementation:

- Develop an index of ecological integrity to 1) determine the current integrity ranking, 2) determine what areas of integrity are low and need attention, 3) prioritize management actions to ensure that the index does not fall below 2010 levels, and, 4) to establish a baseline from which to measure against the targeted 5 to 10 percent improvement
- Inventory the flora and fauna of the marsh to establish a baseline of natural features and water quality to monitor in the future. In particular, determine presence and extent of native marsh and aquatic vegetation, such as spatterdock and wild rice, which are important waterfowl foods.
- Work with VADCR-Division of Natural Heritage and other experts to conduct inventories for rare, threatened, and endangered plants species in Great Marsh. Potential species occurring in the marsh include sensitive joint-vetch, Parker's pipewort, and river bulrush.
- Using SLAMM analysis results, monitor and evaluate conditions in the marshes over the next 15 years with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives where possible and applicable.

- Work with State and Federal agency partners to address any significant water quality issues as they arise in the Potomac River
- Work with volunteers, the Friends Group, and/or other partners to establish a clean-up program in the marsh.

Monitoring Elements:

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native tidal freshwater marsh species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:
  - Develop the integrity index and use to determine what areas of integrity are low and need attention.
  - Conduct vegetation surveys within the marsh to determine species composition and diversity.
  - Conduct inventories and monitoring of waterfowl and wading birds. Utilize data to document the effectiveness of management activities and adjust management as necessary.
  - Conduct fish surveys to document species abundance, composition and diversity.
  - To maintain desired quality and characteristics of the tidal freshwater marsh, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than 5 percent of refuge wetland acreage, and fundamental objectives are not compromised.
  - Monitor presence of beaver and work with APHIS or other licensed agent to control these species as necessary to protect public safety and refuge resources.

Objective 2.2 Little Marsh Management

Manage the existing 50-acre Little Marsh impoundment and 1.5-acre Little Marsh Road impoundment to enhance quality habitat available for wading birds (e.g., least bitterns, great blue herons, black-crowned night herons) and waterfowl (e.g., wood ducks and hooded mergansers) during the breeding season and during peak spring and fall migration periods, while also providing habitat for other priority species of concern identified in the BCR 30 plan (e.g., bald eagles, Louisiana waterthrush, and prothonotary warblers) and other native wildlife identified as species of greatest conservation concern in the Virginia WAP (e.g. American bittern, king rail, little blue heron, and yellow crowned night heron), through a combination of water level management, wetland restoration, and invasive species control. These measures will include:

1) Annually provide high quality foraging habitat for wading and marsh birds, specifically great blue herons (Summer: July-late August). This habitat would consist of open, shallow water (2-10 inches water depth) with patches of emergent wetland plants that support fish, invertebrates and amphibians.
2) Annually support migratory waterfowl through a mix of shallow (6-24 inches water depth) flooded vegetation (*Carex, Polygonum, Peltandra*) at times of peak migration (spring: late March, and fall: late October).

3) Annually support migratory wading birds through a mix of shallow remnant pools (6-12 inches water depth) at times of peak migration (spring: late March, and fall: late August)

Rationale
The Little Marsh impoundment provides bald eagles and great blue heron a relatively secluded wetland with surrounding mature hardwoods and conifers, and an abundance of food, in close proximity. This juxtaposition of habitat features is critical to supporting nestlings and fledglings for all the species noted in the objective, particularly bald eagles and great blue herons.

Little Marsh, at 50 acres, contributes significantly to the biological diversity on the refuge. It hosts a variety of wintering and migrating waterfowl, similar to Great Marsh. Water levels in the marsh can be regulated with a water control structure. Through most of the year the water level is kept high to control growth of undesirable woody vegetation and to provide winter habitat for waterfowl. In July, the marsh is drawn down to promote the growth of preferred waterfowl foods around the perimeter while concentrating fish in the deeper channels which increases the availability of prey for fledgling eagles and herons.

The Little Marsh Road impoundment is an upgradient impoundment on the refuge that provides opportunities for effectively managing a small freshwater wetland for a diversity of species of conservation concern. The following birds of conservation concern are known to breed on Mason Neck Refuge and could benefit from enhanced management of the Little Marsh Road impoundment: prothonotary warbler, Louisiana waterthrush, bald eagles, wood duck, hooded merganser, least bittern, black-crowned night heron, great blue heron, and green heron. Their conservation status in various ecoregional plans is presented in appendix A.

Hiring a biologist and obtaining increased project funding would allow us to upgrade our management and protection of the Little Marsh Road impoundment.

Strategies
Continue to
- Prohibit public access to Little Marsh; both foot and boat access is prohibited
- Maintain signs alerting boaters it is prohibited to land on the dike
- Use law enforcement officer to conduct outreach and enforce restrictions
- Maintain water control structures and road culverts
- Conduct a slow drawdown lasting about 4 weeks in summer to improve foraging habitat for wading birds, specifically great blue herons.
- Exclude public from Little Marsh Road to protect sensitive wildlife area

Over the 15 years of CCP implementation:
- Determine the water level regime by season, which would best promote quality marsh habitat favored by bald eagles, water and wading birds, and waterfowl. Implement plans to manipulate water levels and vegetation at draw down times throughout the year, and incorporate actions in HMP. In developing water level management, consider:

- Lowering water level to allow bottom to dry out and oxygenate to allow better emergent plant growth, and/or re-flooding to a lower level to provide better access to feeding areas by wading birds.

- Timing drawdown initiation when great blue heron young are observed in the nests. This will allow for sufficient time to conduct the drawdown and concentrate food resources.

- In the summer, consider only drawing down water levels to the point where water primarily remains only within the channels and various coves of the impoundment. Thus, concentrating prey resources into the smallest volume of water accessible to great blue herons.

- Maintain high water levels throughout a growing season and/or use of prescribed fire, to eliminate perennial woody vegetation that is encroaching upon the impoundment. Frequency of woody vegetation management may be dictated by heron use.

- Reflood the impoundment prior to Fall frost and freezing weather to allow amphibians and reptiles sufficient time to locate underwater over-wintering habitat. Maintain water depths throughout the winter that are sufficient for fish populations.

- Control beaver, if needed, to meet water regime objectives. Both non-lethal and lethal measures would be employed as warranted.

- Inventory the flora and fauna of the marsh to establish a baseline of priority natural resources to monitor in the future. In particular, determine presence and extent of native marsh vegetation.

- Work with VADCR-Division of Natural Heritage and other experts to conduct inventories for rare, threatened, and endangered plants species in Great Marsh. Potential species occurring in the marsh include sensitive joint-vetch, Parker's pipewort, and river bulrush.

- Determine fish species that currently and/or historically use the impoundment for spawning and rearing.

- Upgrade the water control structure as needed to improve management capability and consider placing a "windowed" stop-log water control structure to allow fish passage into the impoundment.

- Hire additional maintenance staff as indicated on the staffing chart (appendix E) to help manage and maintain water control structures.

Monitoring Elements:

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native wetland species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Monitor bird response to drawdown rates and water depths to determine optimal water depths for target species groups.

- Conduct vegetation surveys within the marsh to determine species composition and diversity.
- Conduct fish surveys to document species abundance, composition and diversity.
- To maintain desired quality and characteristics of the Refuge's impoundments, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than 5 percent of refuge wetland acreage, and fundamental objectives are not compromised.
- Monitor presence of beaver and work with APHIS or other licensed agent to control these species as necessary to protect public safety and refuge resources.

Objective 2.3 Shoreline Protection

Increase efforts maintain the integrity of the 4.4. miles of Refuge shoreline and minimize bluff erosion on the Potomac River by working with partners to monitor and maintain the existing 200 feet of breakwater structures and conduct a risk assessment to prioritize restoration areas and methods.

Rationale
Refuge lands currently include approximately 4.4 miles of shoreline at the base of high bluffs along the Potomac River and Occoquan Bay. Erosion of the shoreline by tidal and storm flows, undermining of the bluffs by beach loss, and wind and rain erosion have been incrementally removing the substrate and the resulting tree loss shrinks important upland habitats. This is especially problematic along the refuge southwestern corner, where tree loss threatens the heron rookery. We will continue to explore and evaluate stabilization techniques to determine which is most effective and practical for refuge lands.

Obtaining increased funding and staffing would allow us to upgrade our efforts to address this continuing threat to refuge habitat integrity as well as better protect shoreline archeological resources.

Strategies
Continue to
- Minimize public access to shoreline
- Seek partnerships to fund and install breakwaters and/or other measures to protect the shoreline
- Work with partners to maintain the refuge shoreline and monitor the 200 ft of breakwater structures

Over the 15 years of CCP implementation:
- Engage in public outreach and education to explain the sensitive nature of shoreline habitats and the importance of reducing human disturbance, particularly along the proposed Captain J. Smith Trail.
- Manage public use in these areas to ensure compatibility of visitor's activities, especially during sensitive times of the year for wildlife.
- Work with experts to conduct a risk assessment to prioritize shoreline and identify practicable and feasible projects

- Work with the same experts and other partners to develop proposals, to seek funding for new shoreline protection projects, and to evaluate project success.

Monitoring Elements:

- Conduct appropriate monitoring and survey programs as funding and staffing permits. The following are all components of how we would measure our success with respect to our objectives, and the results may trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives. Examples of monitoring or surveys that we may implement include:

  - Work with partners to monitor the effectiveness of existing refuge shoreline breakwater structures in reducing erosion along the protected area of the shoreline

  - Partners to monitor the erosion rates along unprotected areas of the shoreline and determine the areas in greatest need of protection.

Objective 2.4 Aquatic Habitat and Water Quality

Improve the water quality and available aquatic habitat of Great Marsh and other tidally influenced marshes and inlets through an active role in local, State, and Federal partnerships in order to reduce contaminants and enhance spawning, nursery, foraging, and cover habitat for Federal trust fish populations, including American eel, alewife, blueback herring, hickory and American shad, menhaden, striped bass, and Atlantic and shortnose sturgeon, and other native aquatic species. Partnerships may involve facilitation, research, monitoring, and management.

Rationale

The tidal Potomac River and associated marshes and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Neabsco Creek) the smaller streams that include Great Marsh creek, and the marshes along the Virginia shoreline for habitat. Interjurisdictional fish that are listed as species of concern by VDGIF (2005) and are Service Regional high priorities include the shortnose sturgeon (Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV) and American eel (Tier IV). Other species of management concern listed in the Service's Region 5 Strategic Fisheries plan include: blueback herring, hickory shad, menhaden, and striped bass (USFWS, 2009b). All of the species listed above occur from the fall line to the mouth of the river at some time during their life cycle

Due to lack of available staff, the refuge is reliant upon partnerships to improve aquatic habitat and operates in the capacity of allowing others access to the Potomac River and its tributaries in order to support the needs of trust fish species. We respond to requests for assistance related to fisheries issues from our Virginia Fisheries Program Office, as well as from VDGIF and the Potomac River Fisheries Commission (PRFC). The VDGIF and PRFC regulate the fisheries of the main stem of the tidal Potomac River from the Maryland/District of Columbia boundary line (near the Woodrow Wilson Bridge), to the mouth of the river at Point Lookout, Maryland and Smith Point, Virginia. The PRFC regulates and issues licenses for all recreational and commercial fishing, crabbing, oystering and clamming in the main stem tidal Potomac River. The PRFC coordinates regulations with the Maryland Department of Natural Resources (DNR), the Virginia Marine Resources Commission (VMRC) and VDGIF, and with the other Atlantic coastal states through the Atlantic States Marine Fisheries Commission (ASMFC). Obtaining increased funding and staffing would allow us to upgrade our efforts to better facilitate this much needed monitoring, management and research.

Strategies
Continue to
- Provide assistance to researchers upon request, typically as logistical support, to facilitate their research on fish and other aquatic species on the refuge and in the tidal Potomac River

- Monitor invasive aquatic species and distribution, and treat when funding and staffing allows

Over the 15 years of CCP implementation:
- Coordinate with the Service's Virginia Fisheries Program Coordinator's Office to assess fisheries resources on the refuge and determine enhancement opportunities

- Participate in partnerships with other State and Federal agencies to address interjurisdictional fish issues related to the refuge and nearby Potomac River waters.

- Work with the Virginia Ecological Services Office to provide information and input to the contaminant and total maximum daily load (TMDL) regulation process at the Federal and State level.

- Participate in spill prevention, control, and countermeasure plans or other environmental emergency action plans as related to protection of Great Marsh and the Potomac River.

- Work with Virginia Ecological Services and the Virginia Fisheries Coordinators Office in coordinating and providing technical assistance to fish passage, stream, and riparian restoration projects within the Potomac River watershed that have potential to increase available habitat for species utilizing the refuge or improvements to water quality.

Monitoring Elements:
- Establish and coordinate development of a water quality monitoring station at the refuge with interested parties such as George Mason University.

- Work in partnership with local universities, as well as State and Federal agencies, to complete a series of fish inventories to obtain baseline information of fish species diversity and species health in order to evaluate impacts of tidal marsh water quality changes.

- Conduct inventory surveys of bird, mammal, amphibian, and turtle populations within and around the freshwater tidal marsh in partnership with local universities. Utilize data to assess the short-term and long-term impacts of management activities and adjust management protocols as necessary.

GOAL 3: **Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation and wildlife observation.**

Objective 3.1 Deer Hunting Continue to improve the annual, public, high-quality white tailed deer hunt program to support deer population and forest health and condition objectives.

Rationale
Deer hunting accomplishes a very significant function on the refuge; to keep the deer population within the carrying capacity of the habitat. Our hunt program is primarily designed to manage the herd size on the refuge to benefit forest integrity, diversity and health as well as the health of the deer herd. The recreational opportunity it affords is a secondary benefit. We, however, recognize

hunting as a healthy, traditional outdoor pastime, deeply rooted in our American heritage and are pleased to be able to provide the opportunity. Public hunting opportunities have been on the decline as development pressures increase in the region. Hunting is one of the six priority wildlife-dependent public uses of the Refuge System as established in the 1997 Refuge Improvement Act. In addition, Presidential Executive Order #113443- Hunting Heritage, "…directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat."

Deer management must occur across the entire Mason Neck Peninsula in order to be effective in balancing population with quality habitat conditions throughout the area. We will continue to cooperate with the Mason Neck Management Area to ensure that broader population goals are met. Our hunt is a joint effort with Mason Neck State Park, combining both land ownerships in the hunt area, in a permit-only and closely monitored hunt. Elsewhere on the peninsula, Gunston Hall has a limited hunt, but is exploring ways to expand it, and the BLM is working with VDGIF, Fairfax County, and the refuge to continue hunting opportunities initiated in 2009. Using data collected by the VDGIF from harvested animals, we extrapolate population condition, age, and sex structure to help adjust the hunt program annually, as needed.

Deer populations on the refuge increased from the time of refuge establishment in 1969 until 1990 when the refuge was opened to firearm and archery hunting. The refuge hunt program conforms to State regulations and additional refuge regulations stipulated in Title 50 of the Code of Federal Regulations. As the objectives in the 1990 hunt plan state, we intend to maintain the deer population at a level compatible with available refuge habitat (between 90 and 120 deer), to limit the amount of damage to public and private property in the vicinity of the refuge, and to provide a wildlife-oriented recreational opportunity for the public. As in all refuge programs, we make special accommodations upon request, whenever possible, to further facilitate accessibility.

The following are the guiding principles of our hunting program, according to Service policy (605 FW 2):

1) Manage wildlife populations consistent with refuge system-specific management plans approved after 1997 and, to the extent practicable, State fish and wildlife conservation plans.

2) Promote visitor understanding of and increase visitor appreciation for America's natural resources.

3) Provide opportunities for quality recreational and educational experiences.

4) Encourage participation in this tradition.

5) Minimize conflicts with visitors participating in other compatible, wildlife-dependent recreation.

Strategies
Continue to
- Cooperate with VDGIF in assessing deer population and condition estimates

- Provide technical support for deer hunt programs on other public lands on Mason Neck Peninsula

- Maintain current shotgun deer hunt program which includes:

    - State and local partners involvement in hunt administration;

- Mason Neck State Park as part of hunt area
- An average target of 90-100 deer harvested/year; or otherwise a target number recommended by VDGIF biologists

Over the 15 years of CCP implementation:

- Increase Service support for deer hunt programs on all public lands on Mason Neck Peninsula, encouraging each agency to implement a program; work collaboratively within the existing Mason Neck Manager's Working Group to design hunts.
- With additional refuge staff (appendix E—staffing chart), partners, and other resource support in place, consider increasing length of shotgun season, number of hunters, and their distribution when declining forest health and conditions warrant an increased harvest. Indicate changes each year in annual hunt plan.
- Annually review the amount of staff time involved with the hunt and consider ways to be more efficient with its administration, such as seeking new partners, staying informed of new technology, and use of web-based programs
- Provide an archery deer hunt for qualified archers during the regular State archery season (similar to the program that was implemented in past years) under the following guidelines:
  - Archery hunt area would be in refuge areas otherwise closed to visitors (so other refuge visitors are not affected), and would be a safe distance away from all trails open to non-hunting refuge visitors
  - New Refuge staff would need to be in place to help coordinate and support hunt, as would adequate funding, equipment and administrative resources (appendix E—staffing chart). VDGIF and other partners would also need to be involved to help administer the hunt
  - Archery hunters would park in designated hunter parking areas away from the trail-head parking areas
- Complete other administrative requirements to formally open the refuge to new hunts as soon as approved and determined practicable.

Objective 3.2 Youth Turkey Hunting

Work with VDGIF and other conservation partners to develop and implement a youth wild turkey hunt.

Rationale

As we mentioned in our discussion under objective 3.1—deer hunting, hunting is identified in the 1997 Refuge Improvement Act as a priority wildlife-dependent public use on refuges. In addition, Presidential Executive Order #113443-Hunting Heritage, "…directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat." We also presented our guidelines for a quality hunt program under objective 3.1.

We recognize wild turkey hunting as a traditional outdoor pastime. When managed responsibly, it can instill a unique appreciation of wildlife, their behavior, and their habitat needs.

We also recognize that we must be proactive in engaging young people in wildlife conservation stewardship of the environment if we are to maintain a legacy of

abundant wildlife and healthy habitats for future generations. One way to do that is to offer quality opportunities for youth participation in hunting on our refuges.

Strategies
Over the 15 years of CCP implementation:
- Provide up to a 3-day turkey hunt for youth hunters under the following guidelines:
  - New Refuge staff would need to be place to help coordinate and support hunt, as would adequate funding, equipment and administrative resources (appendix E—staffing chart). VDGIF, National Wild Turkey Federation, and other partners would need to be involved to help administer the hunt
- Implement the hunt during the State's spring and/or fall turkey season, allowing up to approximately 10 hunters access at one time, and distribute hunters to minimize impacts on other public use programs
- Hunt area would be in refuge areas otherwise closed to visitors (so other refuge visitors are not affected), and would be a safe distance away from all trails open to other refuge visitors
- Complete all other administrative requirements for a new hunt as soon as approved and determined practicable

Objective 3.3 Waterfowl Hunting

Enhance opportunities for more people to engage in waterfowl hunting in State waters near the refuge by actively supporting VDGIF's program.

Rationale
Since Mason Neck Refuge was established in 1969, the Service has not allowed waterfowl hunting on the refuge because it conflicts with the original refuge establishment purpose of protecting bald eagles. Further, areas in Great Marsh are specifically closed to waterfowl hunting by Director's order (FR 34:194 (October 9, 1969)).

In less sensitive areas on the Potomac River and Occoquan Bay, we fully support waterfowl hunting as a legitimate wildlife-based recreational pursuit. We plan to support VDGIF in ensuring the public has opportunities for waterfowl hunting in those State waters near the refuge where it is currently allowed.

Strategies
Continue to
- Coordinate with VDGIF conservation officer in addressing any waterfowl hunting issues
- Prohibit waterfowl hunting on refuge lands

Over the 15 years of CCP implementation:
- Work with VDGIF to evaluate the use of temporary floating blinds to replace fixed blinds in State waters near the refuge shoreline to provide waterfowl hunting opportunities to more people.

Objective 3.4 Wildlife Observation and Photography

Enhance opportunities for wildlife observation and photography by upgrading trail and parking facilities, and constructing new trails, observation platforms, and photography blinds.

Rationale
The 1997 Refuge Improvement Act identifies wildlife observation and photography as priority wildlife-dependent recreation. Wildlife observation has

also been identified by our Regional Visitor Services Review Team as an area of emphasis for this refuge. Both wildlife observation and photography promote the understanding and appreciation of natural resources and their management on all lands and waters in the refuge system. Since 1971, the refuge has provided daily opportunities for wildlife observation and photography on refuge trails.

Pursuant to Service policy (605 FW 4 and 5), we follow these guiding principles for wildlife observation and photography opportunities at the refuge.

1) Provide safe, enjoyable, and accessible wildlife viewing and photography opportunities and facilities.

2) Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.

3) Focus on providing quality recreational and educational opportunities, rather than quantity, consistent with Service criteria describing quality found in 605 FW 1 Part 1.10.

4) Minimize conflicts with visitors participating in other compatible, wildlife-dependent recreation.

Existing opportunities are available on the Joseph V. Gartlan, Jr. Great Marsh (Great Marsh), and the Woodmarsh trails. These trails include parking areas, interpretative panels, and overlooks and observation platforms. These trails are promoted and described on informational signs, in refuge brochures, and on the refuge website. Under alternative B, we would enhance existing infrastructure and site accessibility to increase the safety, quality and diversity of these opportunities. We also plan to create additional trails, assuming archeological field surveys verify that acceptable, or no, impacts to archeological resources would occur, on Sycamore Road and Treestand Road (map 3.1). These new and existing trails will be supplemented with new viewing platforms and photography blinds. The location of the new trails, platforms, and blinds would provide visitors with quality viewing opportunities while also minimizing disturbance to wildlife or sensitive plant communities. Not all of the platform locations have been finalized yet, as additional archeological site evaluations would need to occur. Refuge trails would remain open during refuge hours of operation (typically April through September from 7am to 7pm and during October through March from 7am to 5pm, except as otherwise permitted under a special use or hunt permit). Only foot travel will be allowed on these existing and planned refuge trails.

One additional trail, the High Point Trail, begins outside the refuge boundary, but runs through the refuge and terminates at Mason Neck State Park (3.0 miles total; 0.5 miles on refuge). This is an asphalt multi-use trail, where bicycles and other non-motorized pedestrian uses are allowed. This trail is cooperatively administered and managed with Mason Neck State Park.

Strategies

Continue to

- Maintain the two current refuge trails: Woodmarsh (2.5 miles); Joseph V. Gartlan, Jr. Great Marsh (0.75 miles); and the High Point (3.0 miles total; 0.5 miles on refuge)

- Close portions of the Woodmarsh Trail from December to June to protect nesting bald eagles

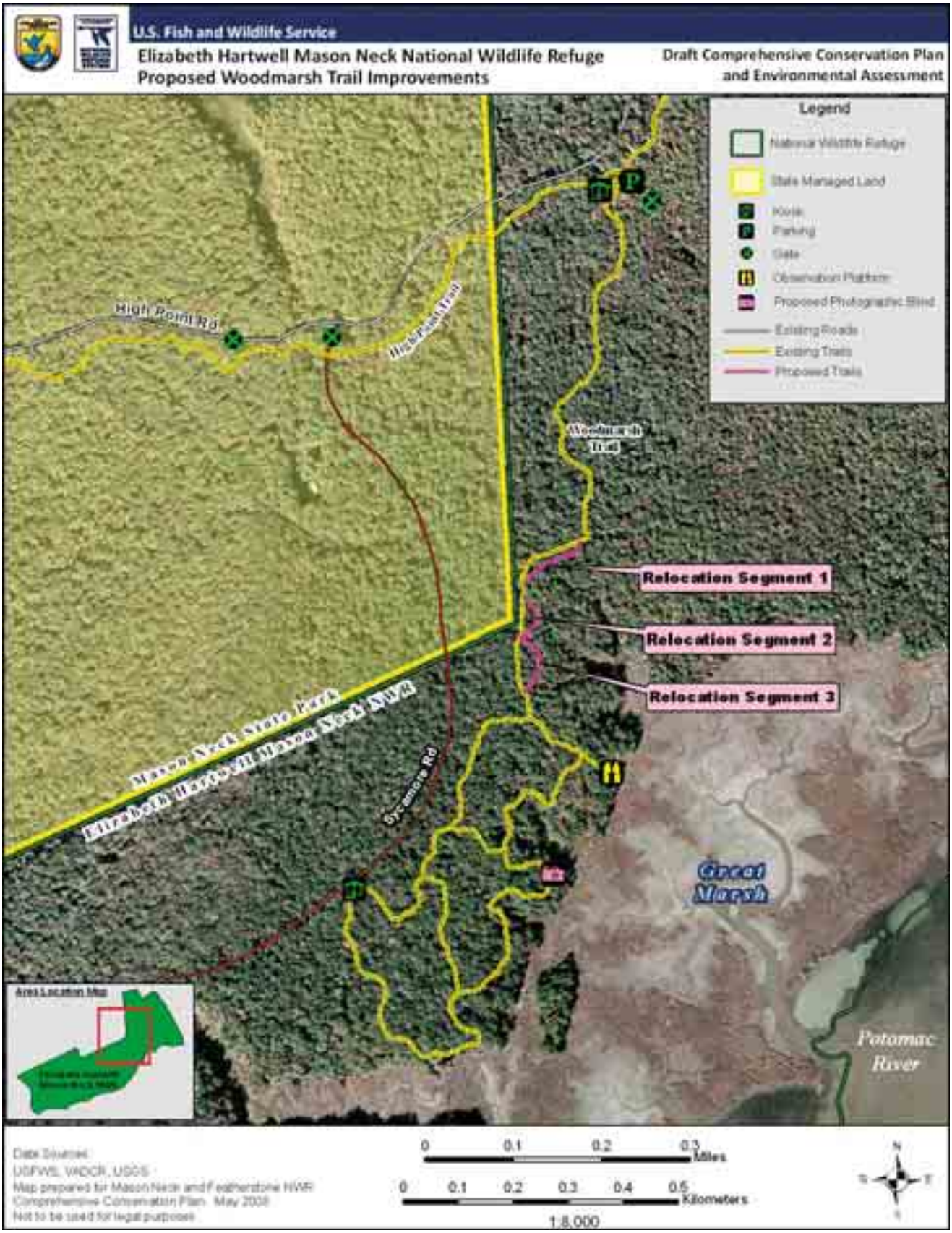
Map 3.1. Existing and Proposed Public Use Features at Mason Neck Refuge

- Allow foot travel as the only mode of transportation on Woodmarsh and Great Marsh Trails
- Cooperate in managing the High Point multi-use trail with Mason Neck State Park; allowing all forms of non-motorized pedestrian access and travel
- Prohibit motorized use and horseback riding on all trails
- Prohibit geo-caching, letterboxing and other forms of "treasure hunting" on the refuge
- Continue to collect monthly visitor use data for the High Point Trail, the Great Marsh Trail and the Woodmarsh Trail

Over the 15 years of CCP implementation:

- Hire visitor services and maintenance staff as indicated in staffing chart (appendix E) to support new and/or improved refuge facilities, increased and enhanced visitor and outreach programs, and other expanded public uses and outreach identified under goals 3 and 4
- Prioritize list of improvements and new construction noted below and implement projects as funding allows
- Improve Woodmarsh Trail, including (see map 3.2)
  - Trail realignment to higher ground along approximately 1,000 feet by rerouting trail through aesthetically pleasing terrain to afford sustainable upkeep
  - Improving trail surface to all-weather
  - Considering making part or all of the trail accessible
  - Improving boardwalks over wet areas
- Improve Woodmarsh trailhead including, drainage, paving, lighting, gates, the kiosk, and welcome and directional signs
- Reconfigure Woodmarsh Trail within existing loops to bypass sensitive eagle area, but allow for additional access
- Develop a trail leading from the Woodmarsh Trail-Sycamore Road kiosk to the end of Sycamore Road and the Potomac River overlook. This segment will be known as Sycamore Trail. Consider building a viewing platform overlooking Potomac River if feasible. Ensure trail and platform construction do not adversely affect archeological resources likely to be in the vicinity. Allow foot travel as the only mode of transportation on Sycamore Trail
- Develop Treestand Road as a trail that connects Woodmarsh and Great Marsh trails. This segment will be known as Treestand Trail. Create marsh viewing area if minimal vegetation would be impacted. Allow foot travel as the only mode of transportation on Treestand Trail.
- Collect visitor use data, according to Service guidance, to determine the number of visitors and what activities they are engaged in

Map 3.2 Proposed Woodmarsh Trail improvement at Mason Neck Refuge



Objective 3.5 Interpretation Program

Enhance the refuge's interpretive program to more effectively communicate to the public the values and regional significance of refuge habitats, wildlife, and cultural resources.

Rationale

The 1997 Refuge Improvement Act identifies interpretation as priority wildlife-dependent recreation. Interpretation has also been identified by our Regional Visitor Services Review Team as an area of emphasis for this refuge. Interpretation includes, but is not limited to, activities, talks, publications, audio-visual media, signs, and exhibits that convey key messages about natural and cultural resources to visitors. Visitors who experience interpretation have the opportunity to make their own connections to the resource leading to possible resource stewardship and the understanding of resource relationships and human impacts.

The refuge interpretive program includes a variety of experiences that appeal to varying audiences, visitor interests, and learning styles. By having quality self-guided programs, in addition to staff and partner-led interpretation, we are able to reach a larger audience, be more readily available, and allow visitors to explore at their own pace, while still allowing for discussion and providing answers to questions. Current efforts include on and off-site talks and tours as well as written information provided through informational signs, brochures, and refuge websites. We use visitor and attendee feedback to evaluate the effectiveness of our program.

FWS policy (605 FW 7) defines interpretive programs as management tools to accomplish the following:

- Provide opportunities for visitors to become interested in, learn about, and understand natural and cultural resource management and our fish and wildlife conservation history.
- Help visitors understand their role within the natural world.
- Communicate rules and regulations to visitors, thereby promoting understanding and compliance to solve or prevent potential management problems.
- Help us make management decisions and build visitor support by providing insight into management practices.
- Help visitors enjoy quality wildlife experiences on the refuge.

Further, the new policy provides these guiding principles for interpretive programs:

- Relate what is being displayed or described to something within the personality or experience of the visitor to provide meaningful context.
- Reveal key themes and concepts to visitors based on information.
- Inspire and develop curiosity.
- Relate enough of the story to introduce concepts and ideas and pique visitor interest, discussion, and investigation so that visitors develop their own conclusions.

- Organize activities around theme statements.

We strive to follow those principles, which will serve to enhance visitors' understanding of the area's significant resources, as well as the important role the refuge plays in their conservation.

Another effort underway related to interpretative activities on the refuge is the proposed Captain John Smith Chesapeake National Historic Trail. In September 2010, the NPS released for public review and comment the draft Comprehensive Management Plan and EA for this trail. The trail is the first national water-trail and commemorates the explorations of John Smith on the Chesapeake Bay and its tributaries in 1607-1609, tracing approximately 3,000 miles of his voyage routes.

The NPS is working with many partners to plan, develop, and manage the trail, including refuges in the Chesapeake Bay area. Other partners include the Friends of the Captain John Smith Trail, the Chesapeake Bay Gateways and Watertrails Network, Federal and State agencies, communities, nonprofit organizations, and businesses. The draft plan and EA outline how the NPS and these partners will develop component water trails, provide access to the trail, interpret the John Smith voyage, and protect the important resources related to the trail. Refuges in the Chesapeake Bay area, including the Potomac River Refuge Complex, have been coordinating with the NPS on identifying compatible opportunities on refuge lands to support this effort. We will continue to coordinate with the NPS on developing opportunities for the trail consistent with the final decision of the CCP.

Strategies

Continue to

- Distribute general refuge brochure and post at kiosks

- Maintain interpretive and other pertinent refuge information at the three kiosks located at the Woodmarsh trailhead, the Woodmarsh Trail near Sycamore Road, and the Joseph V. Gartlan, Jr. Great Marsh trailhead.

- Install interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities

- Work with the Mason Neck State Park to participate in events

- Coordinate with the National Park Service to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.

- Work with the Mason Neck Refuge area agencies in constructing a joint agency kiosk on Gunston Road near the entrance to the Mason Neck Peninsula to orient visitors and tell the story about each agency. This kiosk would:

  - Contain a map of the area including agency lands,

  - Information about the purposes and management of each agency, recreational opportunities, and regulations for each area

Over the 15 years of CCP implementation:

- Develop Visitor Services plan to address the agency mission, refuge purpose, infrastructure, and specific Service and Regional emphasis. Include the following:

- Interpretation of bald eagle biology and exploring options for meeting visitor expectations of seeing eagles without disturbing them
- Installation of interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities
- Clarification in materials distinguishing Mason Neck State Park and refuge through various forms of media and programming and standardized signing.
- Explanation of what is a compatible, wildlife-dependent public use and why that is a priority for the Refuge System
- Interpretation of management practices through various forms of media and in clear terms for urban visitors
- Addressing law enforcement issues relating to visitor safety and resource protection through interpretive programming
- Initiate Refuge Watch Program to provide a means for the public to report crimes and criminal activity.
- Provide access to quality materials via a refuge complex website

- Assess refuge signs to add, move, replace, or update them to conform to R5 Service sign standards and be consistent with Refuge Complex sign plan. Install appropriate welcome and directional signs, trailblazer signs, trailhead signs, waysides, and other required signs
- In coordination with Virginia Department of Transportation (VDOT), install standard State highway directional Trailblazer signs to the refuge on I-95 and US Route 1
- Explore option of using trained volunteers and Friends Group members to conduct onsite and offsite interpretive programs and interpretive walks.
- Explore option of installing a Travelers Information System on Mason Neck Peninsula. This AM radio station and frequency would be dedicated to broadcasting general, emergency and interpretive information about the refuge and Mason Neck State Park.

Objective 3.6 Environmental Education Program

Enhance environmental education opportunities on the refuge by rehabilitating outdoor education facilities, and increasing education partnerships and educator-led programs.

Rationale

The Refuge Improvement Act identifies environmental education as a priority wildlife-dependent recreation activity. It teaches students of all ages the history and importance of conservation and ecological principals and scientific knowledge of our Nation's natural resources. Through that process, we can help develop a citizenry that has the awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively toward the conservation of our Nation's environmental resources.

We have not actively pursued an environmental education program on the refuge in recent years due to limited staffing and funding. As discussed earlier

in this chapter, our Region made a difficult decision at each refuge regarding which two of the six priority public uses would receive management emphasis to make efficient use of what funding and staffing was available. Although it was determined that wildlife observation and interpretation would be the priorities for this refuge, it still contains valuable resources that offer excellent environmental education opportunities without expending significant staff or funding.

Our program to date has been limited to providing access for teacher-led research projects by students from Thomas Jefferson High School. While we facilitate these programs, we do not otherwise design or implement programs.

Additional staffing and funding would allow us to be more proactive in developing a core environmental education program in conjunction with the facilities and programs of Mason Neck State Park as well as through rehabilitation of our own educational facilities on Sycamore Road.

Strategies
Continue to

- Allow Thomas Jefferson High School to conduct environmental educational activities on the refuge including vernal pool studies and deer pellet counts
- Facilitate other environmental education opportunities and programs upon request

Over the 15 years of CCP implementation:

- Partner with Mason Neck State Park to integrate education programs into the existing teachers workshops being offered at the Park's Visitor Center
- Provide information to educators upon request that supports State curriculum standards and emphasizes key themes related to habitat management for bald eagles and heron, and Regional/National themes such as connecting children to nature and global climate change.
- Rehabilitate the old environmental education site and trail for use by teacher-led groups
- Encourage Friends Group and volunteers to work with local schools and other educational institutions to enhance utilization of refuge resources for educator-led environmental education programs; support development of basic lesson plans with these partners
- Support use of the refuge by Fairfax County School District.

GOAL 4: **Enhance efforts to promote public awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.**

Objective 4.1 Volunteers Improve the refuge's volunteer program by expanding the amount and types of meaningful and engaging opportunities that support refuge goals and objectives.

Rationale
Volunteers, Friends organizations and other partners are essential allies for many programs within the U.S. Fish and Wildlife Service. Every day these devoted individuals and organizations play vital roles in helping the Service fulfill its mission and many of our important goals. Each year, volunteers, Friends organizations, and partners generously give time, expertise and resources to the

National Wildlife Refuge System, fish hatcheries, and other Service offices. They play an important role in helping serve over 40 million visitors who enjoy our public lands.

Volunteers help the Service in a variety of ways. Some work full-time while others assist with a few hours a week or month, or during special events. Nationally, many volunteers conduct fish and wildlife population surveys, band ducks, lead tours and provide information to school groups and other visitors, assist with laboratory research, work on cultural resources projects, perform clerical and administrative duties, work with computers and other technical equipment, and much more. Our 40 or so volunteers over the past 3 years have spent between 300 and 800 hours annually on different activities at Mason Neck Refuge including wildlife and habitat, maintenance, and recreation support. Maintaining this level of volunteer support is critical to continuing to maintain our refuge programs.

We would have an opportunity to expand our volunteer program with additional staffing and funding to implement many of the strategies we have identified to meet our biological and public use objectives.

Strategies

Continue to

- Enlist the help of volunteers on an opportunistic basis to support refuge programs
- Develop community service projects to support County court system
- Have volunteers from the community assist in refuge cleanup activities, special events, routine maintenance of trails, roads, and other areas; invasive plant control; bald eagle and other bird counts
- Develop projects for Boy and Girl Scouts upon request
- Issue the monthly refuge complex volunteers newsletter to identify current and upcoming events
- Develop and implement annual volunteer recruitment, training, and appreciation/recognition events

Over the 15 years of CCP implementation:

- Increase the number of volunteers though development of quality, well-organized projects
- Use citizen science volunteer groups to conduct biological baseline studies and monitoring consistent with Service protocols
- Coordinate with other agencies on the Peninsula to recruit, train, and share groups and individual volunteers
- Use volunteers and Friends Group members as docents to lead interpretive walks and as general guides during peak use times (also see objective 3.5)
- Budget training money to provide special technical training to qualified volunteers to enhance their capability to assist in refuge programs
- Address desires of refuge neighbors to participate in refuge management through volunteer opportunities

- Pursue a resident volunteer program (e.g. for a retired couple); partner with another agency on the Mason Neck Peninsula and the region, if necessary, to find a suitable location for housing the volunteers. For example, this may be accomplished through a cooperative agreement with the Northern Virginia Regional Park Authority at Pohick Bay Regional Park.

Objective 4.2 Community Outreach

Ensure more than 50 percent of the adults contacted within Fairfax County will understand the importance of conserving wildlife, habitats, and cultural resources on the refuge, will know that the refuge is part of a national system of wildlife refuges, are aware of the wildlife-dependent recreational opportunities available on the refuge, and plan to visit the refuge or actively participate in refuge programs or volunteer projects within the next year.

Rationale

It is important to build a strong base of public understanding, support, and activism beyond the portion of the American public who visit refuges. To achieve this, the Service has actively supported nationwide strategies, partnerships, legislation, and departmental mandates with a strong emphasis on outreach. These include the 100-on-100 Outreach Campaign, the National Outreach Strategy: A Master Plan for Communicating in the U.S. Fish and Wildlife Service, the Cooperative Alliance for Refuge Enhancement (CARE), the Volunteer and Community Partnership Act, and the Challenge Cost-Share Program.

We are particularly interested in outreach to the local communities in Fairfax County and the local commuting locales within the Washington D.C. Metropolitan area. We desire to be a welcomed and valued asset to those communities. A positive community relationship is a crucial link between public support for refuges and effective management of the Refuge System. We are aware that there are many residents who either do not know that a national wildlife refuge is nearby, or do not recognize its regional importance to the Potomac River and Chesapeake Bay ecosystems. Our current outreach program consists of news releases, participating in community events and presentations to local organizations.

We are striving for a well-rounded program of public outreach to enable large and diverse segments of the public to learn about the importance of refuge wetland and upland habitats, species of conservation concern, cultural resources, refuge management, and the refuge's role in the Refuge System. An effective public outreach program can also help win friends and proactively deal with controversial refuge management activities. This program can be used to anticipate and avoid potential conflicts between the needs of wildlife and other refuge uses.

We believe that regular communication within the community is very important. News articles and personal appearances inform our neighbors about what we are doing and why, which could lead to increased understanding, appreciation, and support of our programs. The feedback we receive from these outreach efforts allows us to better understand issues that are important in our communities, and how our management may affect them.

We also believe that actively engaging people in meaningful refuge programs or projects will make a more lasting impression. We offer many opportunities for people to get involved. Partners, volunteers and members of the Friends of Potomac River Refuges are vital to accomplishing our outreach activities. They assist us in community events and refuge visitor programs as well as support gathering of data and maintenance projects. This assistance support us in

meeting the refuge's goals and objectives, supports the missions of the Refuge System and the Service, and fosters good community relationships.

Strategies
Continue to
- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities
- Routinely respond to written, telephone, and in-person inquiries from the public.
- Maintain and regularly update contact information for the media, and the general public
- Inform refuge neighbors of refuge management activities via the website, press stories, and newsletters
- Promote our successes in the local community via refuge and community events, project demonstrations, and media stories
- Utilize volunteers to participate in community events in Fairfax County where effective outreach of refuge programs can occur
- Continue to maintain website with links to newsletters, the Potomac River Refuge's Friends Group, and other pertinent refuge information

Over the 15 years of CCP implementation:
- Develop and implement procedures to offer refuge "behind the scenes" tours to the media and the general public
- Create and maintain refuge-specific fact sheets
- Expand refuge outreach programs to include recognized events such as, but not limited to, International Migratory Bird Day, National Wildlife Refuge Week, and the Eagle Festival, and designed to promote wildlife-dependent recreation and natural resource education
- Work towards more informed and productive relationships with the local media; establish personal contacts at all media outlets, including radio and TV

Objective 4.3 Partner Outreach

Continue to foster and enhance cooperation and communication with other State and Federal agencies, museums, civic organizations, and environmental and conservation groups to promote and advance the Refuge System mission and refuge goals, and identify mutually beneficial outreach projects and activities.

Rationale
Beyond the Friends of Potomac River Refuges and our volunteers, we have many other partners who help us conduct outreach within professional, academic, non-governmental organizations, and government agency arenas. This is generally achieved through means such as professional or agency meetings and presentations, publications, and refuge tours. We identify many of these partners in goals 1 and 2.

These partners include several government and local agencies active in the refuge area who share in the responsibility to conserve natural resources. Among them are Bureau of Land Management, National Park Service, United States

USFWS

Magnolia warbler

Department of Agriculture–National Resource Conservation Service, Virginia Department of Game and Inland Fisheries, Northern Virginia Regional Park Authority, Virginia Department of Environmental Quality, Virginia State Parks, planning district commissions, historical preservation commissions, soil and water conservation district commissions, chambers of commerce, Fairfax County government, and others. We plan to continue to work closely with some of these entities to achieve mutual outreach objectives.

We also plan to continue our collaborations with educational and research institutions to facilitate their research and investigations that help us seek answers to important natural resource issues on the refuge and within the refuge system and to contribute our basic understanding of important natural resource issues worldwide.

Encouraging relationships with non-governmental conservation organizations active in the Potomac River Basin and Chesapeake Bay region will also be important in our overall outreach strategies. Examples of these groups include the Potomac River Naturalists, Chesapeake Bay Foundation, the Potomac River region members of the Gateways Network, and Alliance for the Chesapeake Bay, and Fairfax Watershed Network.

Strategies
Continue to
- Maintain contact list and ensure regular contact with local groups, environmental groups, and other interested parties active in the Mason Neck Refuge area.

Over the 15 years of CCP implementation:
- Review existing partner relationships to determine if outreach, or the dissemination of information, could be more collaborative and effective
- Review Fairfax County Tourism, Gunston Hall, and other local community organization's events schedules to see if the refuge has a role or contribution
- Seek out new partnership opportunities with museums, historical and botanical groups, civic organizations, and environmental and conservation groups to achieve mutually beneficial projects and activities

Objective 4.4 Elected Official Outreach

Continue to inform elected officials representing the refuge area about refuge management priorities, and special events and activities, on an annual basis or as significant issues arise.

Rationale
Gaining support from Federal, State and local elected officials is essential to meeting our goals. This can only happen when these elected officials are fully informed, and understand and appreciate the significant contribution of the refuge to the refuge system and the quality of life and conservation of Federal trust resources in Virginia. We regularly inform elected officials about upcoming refuge events, and have encouraged them to visit to learn more about the refuge on several occasions. Additional staffing would allow us to increase our elected official outreach efforts to promote Mason Neck Refuge.

Strategies
Continue to
- Invite Federal, State, and local elected officials to attend outreach events held on the refuge

- Provide written or personal briefings for members of Congress, and their staffs, as needed or as requested, to inform them about important refuge issues

Over the 15 years of CCP implementation:
- Invite Federal, State, and local elected officials to attend a guided tour of the refuge, to showcase particular accomplishments, view outstanding natural resource areas, demonstrate management activities, and highlight challenges

Objective 4.5 Research

Enhance research partnership opportunities to provide information for making science-based management decisions or to support regional projects of interest to the Service.

Rationale
We can benefit from targeted research conducted by colleges and universities, such as George Mason University, Virginia Tech, University of Virginia, Virginia Commonwealth University and the College of William and Mary. Research often can answer complex questions about refuge management issues and add to the wealth of scientific knowledge upon which decisions about current and future resource issues will be based.

We plan to take a more proactive role in working with partners to identify and promote, and seek funding for research projects focused on resource issues at Mason Neck Refuge. Disseminating research results, so that others will benefit from what we have learned, will also be a priority.

Strategies
Continue to
- Support inventories and research led by others, such as the MAPS station, that is a priority for the refuge and compatible with refuge purposes, goals and objectives; use both refuge staff or volunteers to support efforts as funding allows

Over the 15 years of CCP implementation:
- In cooperation with State agency and conservation partners, identify the highest priority research and inventory needs for the refuge and the Mason Neck Peninsula which will further conservation and management of Federal trust resources. Refer to all proposed research and inventory and monitoring projects identified under the biological goals and objectives in CCP

- With priority research needs identified, work with partners to develop project specific research goals, study design and methodology and opportunities for alternative sources of funding

- Facilitate the publication and dissemination of refuge research results; consider opportunities to write for lay audiences to the extent possible, in addition to the scientific community

GOAL 5: **Enhance efforts to protect and interpret refuge cultural resources.**

Objective 5.1 Archeological Resources

Enhance efforts to preserve archaeological resources on the refuge from damage by shoreline erosion and visitor foot traffic. Also, improve visitor outreach materials to raise awareness and promote stewardship of archeological resources.

Rationale

Cultural resources that illuminate the pre-contact life of Native Americans at Mason Neck Refuge are trust resources that we must protect and use to educate the public. Some of the peninsula's earliest known inhabitants were Native Americans of the Early Archaic period, over 9,000 years ago. The first recorded history of the area is from Captain John Smith, who wrote of his meeting with Dogue Indians in 1608 and charted the chief's village of Tauxenent on his map of Virginia. The area was at times referred to as Doggs Island and Doeg Neck, until it came into the hands of the Mason family (Lutz, 2003). Additional staffing and funding would allow us to upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the archaeological heritage and environmental history of the refuge to the public.

Strategies

Continue to

- Limit public access to designated trails in certain areas to keep visitors away from known archeological sites on the refuge
- Coordinate with the Service's Regional Archeologist to determine the level of consultation required in conjunction with refuge projects that have a potential to affect archaeological resources
- Conduct archaeological reviews, surveys, or studies of project areas as needed, or recommended, by the Service's Regional Archeologist
- Monitor known archeological sites for looting and trespass

Over the 15 years of CCP implementation:

- Complete refuge wide inventory with GPS data for known archaeological sites and resources
- Work with State and county archaeologists and avocational archeological societies willing to assist in performing targeted surveys with subsurface testing, and to locate and evaluate shoreline sites at risk. Ensure archaeological resources are protected from looting. Develop site management and protection plans as warranted
- Ensure that at least one law enforcement staff person receives ARPA training
- Facilitate research on the refuge to achieve cultural resource protection and conservation objectives
- Use proposed new Sycamore Road Trail as an opportunity to interpret archeological sites
- Raise awareness of the importance of protecting cultural resources through outreach and interpretive information and programs

- Design any new refuge trails, overlooks, or other amenities to avoid impacts to archeological resources
- Conduct targeted surveys with subsurface testing to identify more of the many unrecorded sites likely to be on the refuge and to evaluate their condition and any threats
- Ensure that an ARPA message is incorporated into refuge brochures and on interpretive signs at trailheads, including those produced by refuge partners

Objective 5.2 Historical Resources

Protect historical resources on the refuge from damage by visitors, while also increasing opportunities to engage visitors through interpretation and education to promote an appreciation and increased stewardship

Rationale

There is a rich legacy of post-contact history along the Potomac River shoreline. Mason Neck Peninsula was patented by adventurers in the mid-1600's who traveled up both sides of the peninsula via the Occoquan River and Pohick Creek, and gained familiarity with the lands in-between. In 1755, George Mason IV, author of the Virginia Declaration of Rights, built his home on the peninsula. This Georgian house, known as Gunston Hall Plantation, is on the National Register of Historic Places and is open to the public for tours. A 2,300-acre plantation owned by George Mason V included lands in both the refuge and adjacent Mason Neck State Park. The homesite has been the subject of study by a panel of historians and archaeologists (Lutz, 2003). While 15 historical archaeological sites are recorded on the refuge, at present, none have been formally listed on the National Register.

Additional staffing and funding would allow us to upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the post-contact history and related changes in the natural environment of the refuge for the public.

Strategies

Continue to

- Limit public access to designated trails to keep visitors away from historic sites on the refuge
- Provide interpretation of historic importance of refuge in refuge brochures and kiosks
- Monitor known historical sites for looting and trespass

Over the 15 years of CCP implementation:

- Use new Sycamore Road trail as an opportunity to interpret historic resources on the refuge with sensitivity to ensure they remain protected
- Work with Mason Neck State Park and Gunston Hall to develop appropriate historical resources brochures and signage

Mason Neck Refuge Alternative C—Enhanced Public Use Management

Introduction

Alternative C would maintain our current biological program, with the exception of some additional measures for bald eagles, and focus additional resources on enhancing our visitor services and outreach program. This refuge has a unique opportunity, given its proximity to the Washington D.C. metropolitan area, to educate and inform tens of thousands of people each year on conservation issues, the importance of being a good land steward, and sharing how the refuge contributes to the missions of the Service and Refuge System. Management under alternative C would emphasize this opportunity.

Habitat Management

We would implement a biological program similar to alternative A, except our management of bald eagles would be enhanced similar to alternative B.

Visitor Services and Outreach

We would expand our visitor services and outreach programs the most under this alternative. We would build off our proposals under alternative B to add more wildlife-dependent program activities and amenities. Our objective would be to reach more visitors with our conservation message by increasing infrastructure, providing a broader array of accessible opportunities, and providing new programs with more effective communication strategies, all the while insuring that these increases do not exceed a level at which habitat values would be compromised.

Refuge Administration

Refuge administration would be the same as proposed under alternative B.

Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect, enhance, and restore the biological integrity, diversity and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities including species of conservation concern.**

Objective 1.1 Mature Hardwood-mixed Forest — Bald Eagles Same as alternative B

Objective 1.2 Mature Hardwood-mixed Forest— Migrating Forest Dependent Birds Same as alternative A

Objective 1.3 Heron Rookery Same as alternative A

GOAL 2: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of wetland habitats and shorelines to support native wildlife and plant communities including species of conservation concern.**

Objective 2.1 Great Marsh Management Same as alternative A

Objective 2.2 Little Marsh Same as alternative A

Objective 2.3 Shoreline Protection

Same as alternative A

Objective 2.4 Aquatic Habitat and Water Quality

Same as alternative A

GOAL 3:

Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation and wildlife observation.

Objective 3.1 Deer Hunting

Enhance measures to improve and diversify the annual, public, high-quality white tailed deer hunt program to support deer population and forest health and condition objectives.

Rationale
In addition to the rationale for alternative B, objective 3.1, we recognize the importance of providing a diverse hunting experience. Under alternative C, we propose to add a muzzleloader season. This opportunity, while increasing our administration, outreach and enforcement responsibilities, provides an additional means of reducing deer impacts.

Strategies
In addition to alternative B strategies (assuming full staffing as listed in the staffing chart (appendix E) and assistance from partners)

Over the 15 years of CCP implementation:

- Provide a muzzleloader hunt as part of the deer hunt program; include details in required, revised hunt opening package.
- Complete administrative requirements to formally open the refuge to the new hunt opportunities as soon as practicable

Objective 3.2 Youth Turkey Hunting

Same as alternative B

Objective 3.3 Waterfowl Hunt

Same as alternative B

Objective 3.4 Wildlife Observation and Photography

Enhance public opportunities for wildlife observation and photography by upgrading trail and parking facilities, constructing new trails, observation platforms and photography blinds, and by making Woodmarsh Trail fully accessible.

Rationale
In addition to the rationale for alternative B, objective 3.4, we recognize that upgrading and expanding our trail and parking facilities would provide additional opportunities for a broader spectrum of the public to enjoy wildlife and other natural resources. It would also allow us to further promote the Refuge System mission and enhance the public's understanding and appreciation for the conservation of natural resources. We would also seek additional partnerships with organizations that promote wildlife observation and photography, and that value wildlife resources. A principal objective of these activities would be to foster a sense of stewardship for the Refuge System, wildlife and habitat resources through direct experience.

Strategies
In addition to alternative B strategies

Over the 15 years of CCP implementation:

- Consult with area wildlife photographers to determine placement of up to two photography blinds on the refuge
- Develop a Little Marsh Road Trail to allow seasonal public access, outside the sensitive waterbird nesting season, to the Little Marsh dike
- Make Woodmarsh Trail wheelchair accessible
- Sponsor guided wildlife observation walks on selected trails and in areas otherwise closed to the general public access

Wood duck

Tim McCabe

Objective 3.5 Interpretation Program

Enhance the interpretive program to more effectively communicate to the public the values and regional significance of refuge wildlife, habitats and cultural resources.

Rationale

In addition to the rationale for alternative B, objective 3.5, we would expand our interpretive program to include other-than-sight materials and partnering with Mason Neck State Park on joint interpretive programs and materials would provide opportunities for broader array of the public to gain an understanding of the wildlife and habitat resources of Mason Neck Refuge and the Refuge System. We expect this would garner additional public support for refuge programs.

Strategies

In addition to alternative B strategies

Over the 15 years of CCP implementation:

- Develop and install interpretive materials at kiosks or for use in self-guided tours to provide other-than-sight sensory wildlife experiences: e.g. sound, touch, or smell stations
- Partner with Mason Neck State Park to conduct joint interpretive programs
- Partner with Mason Neck State Park to develop interpretive waysides on High Point Trail

Objective 3.6 Environmental Education Program

Enhance environmental education opportunities on the refuge by rehabilitating outdoor education facilities, and increasing education partnerships and education-led programs.

Rationale
In addition to the rationale for alternative B, objective 3.6, we would expand our environmental education program to include conducting teacher workshops, seniors programs, county school curricula development, and habitat mentoring to provide additional opportunities to educate a wide spectrum of the interested public about the wildlife and habitat resources of Mason Neck Refuge and the refuge system. We expect this would garner additional public support for refuge programs.

Strategies
In addition to alternative B strategies

Over the 15 years of CCP implementation:
- Conduct at least two annual teacher workshops on refuge to promote its use as an outdoor classroom
- Design a senior, Elderhostel, or other adult environmental education program
- Work with Fairfax County to develop public school curriculum based on refuge resources
- Become a Schoolyard Habitat mentoring site.

GOAL 4:

Enhance efforts to promote awareness, understanding and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.

Objective 4.1 Volunteers

Improve the refuge's volunteer program by expanding the amount and types of meaningful and engaging opportunities that support refuge goals and objectives.

Rationale
In addition to the rationale for alternative B, objective 4.1., we would further expand our volunteer program by providing resident volunteer housing and by coordinating with other land management agencies on Mason Neck Peninsula to offer volunteer programs and projects that enhance our ability to meet our biological and public use objectives.

Strategies
In addition to alternative B strategies

Over the 15 years of CCP implementation:
- Expand resident volunteer program to develop a site that would house multiple volunteers; work with land management agency partners on Mason Neck Peninsula to consider residential sites both on and off-refuge and to create a quality cooperative volunteer program

Objective 4.2 Community Outreach

Within 15 years of CCP approval, more than 50 percent of the adults contacted within Fairfax County will understand the importance of conserving wildlife, habitats, and cultural resources on the refuge, will know that the refuge is part of a national system of wildlife refuges, are aware of the wildlife-dependent recreational opportunities available on the refuge, and plan to visit the refuge or actively participate in refuge programs or volunteer projects within the next year.

Rationale
In addition to the rationale for alternative B, objective 4.2, we would focus on developing high-quality products to enhance our ability to reach a wide range of the public and inform them about the Refuge System and the role of this refuge in that system. We would also strive to produce products that foster stewardship

in natural resource conservation, both in their local communities as well as nationally and globally.

Strategies
In addition to alternative B strategies

Over the 15 years of CCP implementation:
- Develop and create a video/DVD about the Potomac River Refuges Complex

Objective 4.3 Partner Outreach

Same as alternative B

Objective 4.4 Elected Official Outreach

Same as alternative B

Objective 4.5 Research

Same as alternative A

GOAL 5:

Enhance efforts to protect and interpret refuge cultural resources

Objective 5.1 Archeological Resources

Enhance efforts to preserve archaeological resources on the refuge from damage by shoreline erosion and visitor foot traffic. Also, improve visitor outreach materials to raise awareness and promote stewardship of archeological resources.

Rationale
In addition to the rationale for alternative B, objective 5.1, we would seek additional funding to further upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the pre-contact history and related changes in the natural environment of the refuge for the public.

Strategies
In addition to alternative B strategies

Over the 15 years of CCP implementation:
- Develop a prioritized program to perform additional surveys and research as funding allows; including a systematic program to monitor erosion impacts on shoreline resources

Objective 5.2 Historical Resources

Continue to protect historical resources on the refuge from damage by visitors, while also increasing opportunities to engage visitors through interpretation and education to promote an appreciation and increased stewardship

Rationale
In addition to alternative B, objective 5.2 rationale, we would develop an erosion monitoring system to further upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the post-contact history and related changes in the natural environment of the refuge to the public.

Strategies
In addition to alternative B strategies

Over the 15 years of CCP implementation:
- Develop a prioritized program to perform additional surveys and research as funding allows; including a systematic program to monitor erosion impacts on resources

- Link with partners to seek research and other grants or supplemental funding to conduct priority projects.

Mason Neck Refuge—CCP Alternatives Comparison Table

Earlier in this chapter, in the section titled "Actions Common to All of the Alternatives," we described many important actions which are not discussed in the table below. Those actions include:

- Using an adaptive management approach, where appropriate
- Consolidating and improving refuge lands and facilities
- Refuge staffing and administration
- Coordinating with refuge partners, Friends of Potomac River Refuges, and the Mason Neck Refuge community
- Protecting Federal-listed species
- Managing invasive plants
- Controlling pest plants and animals
- Monitoring and abating wildlife diseases
- Managing forest health and condition
- Supporting research and investigations
- Developing refuge step-down plans
- Distributing Refuge Revenue Sharing payments
- Protecting cultural resources
- Supporting wildlife-dependent recreational uses
- Continuing a fishing closure at Mason Neck Refuge
- Conducting appropriateness and compatibility reviews of refuge uses

The reader is encouraged to review that section, as well as the detailed discussions in chapter 3 for each alternative, for a complete perspective on each alternative.

Table 3.1 highlights those actions that distinguish the alternatives we analyzed in detail for Mason Neck Refuge. It is also organized to show how they relate to our refuge goals, and the resources and programs of importance to the refuge. Our intent is to provide an easy way to compare and contrast the alternatives. Please refer to the glossary to interpret any acronyms.

Table 3.1 Comparison of objectives and strategies for Elizabeth Hartwell Mason Neck NWR alternatives

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 1: Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities including species of conservation concern.		
Objective 1.1 Mature Hardwood-mixed Forest		
Strategies *Continue to* • Protect all known active nest sites from human disturbance by restricting public access during sensitive nesting periods. • Post trail closures and/or warning signs at appropriate, visible locations to explain to visitors the restriction. • Cooperate with VDGIF and Mason Neck State Park staff in monitoring bald eagle nesting activity. • Utilize refuge law enforcement officers to conduct outreach and enforce restrictions.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities. • Work with Service and VDGIF bald eagle experts to define potential nest and roost stands; identify possible silvicultural treatments to enhance stands and/or individual trees, including thinning, planting, and fuel reductions (to protect from potential wildfires). • Ensure actions meet or exceed the guidelines for protection and management of eagle sites as identified in the Service's National Bald Eagle Guidelines (2007). • Develop nest and/or roost site management plans as warranted, prioritizing actions; incorporate plans into HMP. • Create and maintain a GIS database with locations of active and potential nest and roost sites, and any management activities. Annotate database with results of annual surveys. • Work with VDGIF to conduct mid-summer and mid-winter surveys on the refuge. If funding allows, also conduct nest productivity surveys.	Same as alternative B

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 1: (cont.) Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities including species of conservation concern.		
Objective 1.2 Mature Hardwood-mixed Forest		
Strategies *Continue to* • Work with VDGIF to assess deer populations, deer health, and deer impacts on native vegetation. • Conduct annual deer hunt to control population and associated impacts on vegetation. • Work with USFS to evaluate threat of gypsy moth. Be vigilant for unusual concentrations of pests, pathogens, and invasive plants; respond with respective treatments accordingly, including both chemical and mechanical controls (also see objective 1.5 below). • Treat invasive plants to the extent resources are available; priority is to control mile-a-minute, Japanese stiltgrass, and beefsteak plant. ◆ Treat approximately 1 acre/year; priority along roads and trails, and sensitive resource areas. ◆ Cooperate with the adjacent Mason Neck State Park. • Work with researchers, educators, and/or volunteers on an opportunistic basis to collect resource information. • Conduct outreach, education, and interpretation with visitors to explain the refuge's importance to the full complement of forest wildlife and plants. • Restrict public access to designated trails only. • Support partner-led Monitoring Avian Productivity and Survivorship (MAPS) station bird survey work. • Support volunteer-led bird survey work on an opportunistic basis.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Develop forest prescriptions to benefit forest health and landbird habitat needs; work with partners to evaluate results of VDF forest health assessment to help identify the most significant threats to sustaining biodiversity, and stand structure, function, and composition. Prioritize and implement those treatments that would complement bald eagle and migratory bird objectives. • Incorporate prescriptions, stand treatments, and implementation schedule in HMP. Possible treatments may include prescribed fire, thinnings, plantings, and patch cuts or regeneration cuts to restore/enhance/maintain desired structural and species composition. • Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities identified under this and all other biological objectives. • Maintain all data collected in GIS database; develop habitat map; incorporate survey updates and map occurrences of vernal pools and other unique habitat features. • If prescriptions call for further reductions in deer herd to protect forest health and condition, implement a sharp-shooter program to supplement public hunt. • Continue coordination with the USFS for gypsy moth or other pest monitoring and control; but, also coordinate with Mason Neck State Park and other adjacent landowners on Mason Neck Peninsula to make control measures more efficient. • Evaluate all management actions to ensure they do not contribute to further forest fragmentation. • Establish priority inventory needs and/or monitor for forest wildlife and plants of conservation concern. Incorporate planned activities, their priority and schedule in the IMP. Given available funding and staffing, or under partnerships, implement priority activities.	Same as alternative A

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 1: (cont.) Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities including species of conservation concern.		
Objective 1.3 Heron Rookery		
Strategies *Continue to* • Prohibit public access to Little Marsh and surrounding bluffs and adjacent forest; both foot and boat access is prohibited. • Conduct outreach to communicate the unique and regional. significance of the heron rookery at refuge programs, events, on the website and in other refuge printed information. • Allow volunteer-led efforts to count nest sites. • Use law enforcement officer to conduct outreach and enforce closure area.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Work with experts to assess and implement measures to increase shoreline and bluff protection to reduce potential loss of nesting trees (also see objective 2.4). • Use SLAMM analysis results and monitor and evaluate conditions in the marshes with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives where applicable. • Increase Service visibility and law enforcement presence, increase signage, and other measures as warranted to keep unauthorized persons away from the rookery during breeding season. • Establish a rookery monitoring program with partners and volunteers; incorporate data in GIS. Monitor nest numbers, locations and shifts in their use between years, impacts to vegetation, and impacts from predators (e.g. raccoons) on the population. • Consult with wading and waterbird experts to determine whether vegetation manipulation could enhance rookery conditions. Incorporate any plans into HMP.	Same as alternative A

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 2: Protect, enhance, and restore the biological integrity, diversity and environmental health of wetland habitats and shorelines to support native wildlife and plant communities including species of conservation concern.		
Objective 2.1–Great Marsh Management		
Strategies *Continue to* • Prohibit public access to Great Marsh. Both foot and boat access is prohibited. • Conduct outreach to communicate significance of Great Marsh at refuge programs, community events, on the website and in other refuge printed information. • Partner with VDGIF to conduct winter waterfowl banding and avian influenza monitoring in this area. • Use law enforcement officer to conduct outreach and enforce closure area.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Develop index of ecological integrity to establish baseline condition, monitor changes in marsh over time, and determine where integrity is currently compromised. • Conduct full inventory of flora and fauna; in particular, determine presence and extent of native marsh and aquatic vegetation, such as spatterdock and wild rice, and other important waterfowl foods. • Use SLAMM analysis results to monitor and evaluate conditions over time with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives where possible and applicable. • Work with State and Federal agency partners to address any significant water quality issues in the Potomac River with potential to affect refuge. • Work with volunteers, the Friends Group, and/or other partners to establish a clean-up program in the marsh.	Same as alternative A

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 2: (cont.) Protect, enhance, and restore the biological integrity, diversity and environmental health of wetland habitats and shorelines to support native wildlife and plant communities including species of conservation concern.		
Objective 2.2–Little Marsh Management		
Strategies *Continue to* • Prohibit public access to Little Marsh; both foot access from Little Marsh road and boat access to dike is prohibited. Maintain signs alerting boaters to closure. • Use law enforcement officer to conduct outreach and enforce restrictions. • Maintain water control structures and Little Marsh road culverts. • Conduct slow drawdown for 4 weeks in summer to improve foraging habitat for herons and other wading birds and to control woody vegetation encroachment.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Enhance management by determining the best water level regime by season to promote quality marsh habitat favored by bald eagles, water and wading birds, and waterfowl. Implement plans to manipulate water levels and vegetation at draw down times throughout the year, and incorporate actions in HMP. Consider: ◆ Lowering water level to allow bottom to dry out and oxygenate to allow better emergent plant growth, and/or re-flooding to a lower level to provide better access to feeding areas by wading birds. ◆ Timing drawdown initiation when great blue heron young are observed in the nests. This will allow for sufficient time to conduct the drawdown and concentrate food resources. ◆ In the summer, consider only drawing down water levels to the point where water primarily remains only within the channels and various coves of the impoundment. Thus, concentrating prey resources into the smallest volume of water accessible to great blue herons. ◆ Maintaining high water levels throughout a growing season and/or use of prescribed fire, to eliminate perennial woody vegetation that is encroaching upon the impoundment. Frequency of woody vegetation management may be dictated by heron use. ◆ Reflooding the impoundment prior to Fall frost and freezing weather to allow amphibians and reptiles sufficient time to locate underwater over-wintering habitat. Maintain water depths throughout the winter that are sufficient for fish populations.	Same as alternative A

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 2: (cont.) Protect, enhance, and restore the biological integrity, diversity and environmental health of wetland habitats and shorelines to support native wildlife and plant communities including species of conservation concern.		
Objective 2.2 (cont.)–Little Marsh Management		
	• Control beaver, if needed, to meet water regime objectives. Both non-lethal and lethal measures would be employed as warranted. • Inventory the flora and fauna of the marsh to establish a baseline of priority natural resources to monitor in the future. In particular, determine presence and extent of native marsh vegetation. • Determine fish species that currently and/or historically use the impoundment for spawning and rearing. • Upgrade the water control structure as needed to improve management capability and consider placing a "windowed" stop-log water control structure to allow fish passage into the impoundment. • Hire additional maintenance staff as indicated on the staffing chart (appendix E) to help manage and maintain water control structures.	
Objective 2.3–Shoreline Protection		
Strategies *Continue to* • Work with partners to monitor and maintain the existing 200 ft of refuge shoreline (e.g. breakwater structures). • Prohibit public access to shoreline; utilize outreach and enforcement to maintain closures.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Engage in public outreach and education to explain the sensitive nature of shoreline habitats and the importance of reducing human disturbance, particularly along the proposed Captain J. Smith Trail. • Manage public use in these areas to ensure compatibility of visitor's activities, especially during sensitive times of the year for wildlife. • Work with experts to conduct a risk assessment to prioritize shoreline and identify practicable and feasible projects; work with partners to develop proposals, seek funding for new shoreline protection projects, and to monitor and evaluate project success.	Same as alternative A

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 2: (cont.) Protect, enhance, and restore the biological integrity, diversity and environmental health of wetland habitats and shorelines to support native wildlife and plant communities including species of conservation concern.		
Objective 2.4–Aquatic Habitat and Water Quality		
Strategies *Continue to* • Facilitate compatible research led by partners on fish and other aquatic species in the tidal Potomac River. • Monitor invasive aquatic species and implement control measures when funding and staffing allows.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Coordinate with the Service's Virginia Fisheries Program Office to assess and enhance fisheries resources on the refuge. • Participate in partnerships with other State and Federal agencies to address interjurisdictional fish issues related to the refuge and nearby Potomac River waters. • Work with the Virginia Ecological Services Office to provide information and input to the contaminant and total maximum daily load (TMDL) regulation process at the Federal and State level. • Participate in Spill Prevention, Control, and Countermeasure Plans or other environmental emergency action plans as related to protection of Great Marsh and the Potomac River. • Work with Virginia Ecological Services and the Virginia Fisheries Program Office in coordinating and providing technical assistance to fish passage, stream, and riparian restoration projects within the Potomac River watershed that have potential to increase available habitat for species utilizing the Refuge, or to improve water quality.	Same as alternative A

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 3: Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation and wildlife observation.		
Objective 3.1–Deer Hunting		
Strategies *Continue to* • Cooperate with VDGIF in meeting State deer management plan goals • Maintain current hunt program; ◆ State and local partners involved in hunt admin ◆ Incorporate Mason Neck State Park as part of hunt area ◆ Target an average of 90-100 deer harvested/year or a number recommended by VDGIF biologists • Provide technical support for deer hunt programs on other public land management agencies on Mason Neck Peninsula.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Increase support for deer hunt programs on all public lands on Mason Neck Peninsula, encouraging each agency to implement a program; work collaboratively within the existing interagency Manager's Working Group to design hunts. • With additional refuge staff, partners, and funding resources in place, consider increasing length of shotgun season, number of hunters, and their distribution when declining forest health and conditions warrant an increased harvest. Indicate changes each year in annual hunt plan. • Annually review the amount of staff time involved with the hunt and consider ways to be more efficient with its administration, such as seeking new partners, staying informed of new technology, and use of web-based programs. • Evaluate opportunities to offer a general archery deer hunt for qualified archers during the regular State archery season, similar to years past, assuming new staff and support resources are in place. Hunt area would be away from trails and not affect trail use. Additional NEPA analysis would be required. • Complete administrative requirements to formally open the refuge to new hunts as soon as approved and determined practicable.	In addition to alternative B strategies, and assuming new staff and other support resources are in place, including assistance from partners • Provide a muzzleloader hunt as part of the deer hunt program; include details in required, revised hunt opening package. • Complete administrative requirements to formally open the refuge to the new hunts as soon as approved and determined practicable.
Objective 3.2–Turkey Hunting		
No program	*Over the 15 years of CCP implementation:* • With new staff and support resources in place, and in partnership with VDGIF and National Wild Turkey Federation, provide up to a 3-day turkey hunt for youth hunters during regular State seasons. Hunt area would be away from trails and not affect trail use. • Complete administrative requirements to formally open the refuge to new hunt as soon as approved and determined practicable.	Same as alternative B
Objective 3.3–Waterfowl Hunting		
Strategies *Continue to* • Prohibit waterfowl hunting on refuge lands as per Directors Order (FR 34:194). • Coordinate with VDGIF conservation officer in addressing any waterfowl hunting issues.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Work with VDGIF to evaluate the use of temporary floating blinds to replace fixed blinds in State waters near the refuge shoreline to provide waterfowl hunting opportunities to more people.	Same as alternative B

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 3: (cont.) Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation and wildlife observation.		
Objective 3.4–Wildlife Observation and Photography		
Strategies *Continue to* • Maintain the two trails located entirely on refuge lands: Woodmarsh (2.5 miles) and Joseph V. Gartlan, Jr. Great Marsh (Great Marsh) (0.75 miles) trails. • Cooperate with Mason Neck State Park in maintaining the multi-use High Point Trail where it passes through the refuge (3.0 miles total; 0.5 miles on refuge). • Close portions of the Woodmarsh Trail from December to June to protect nesting bald eagles. • Allow foot travel only on Woodmarsh and Great Marsh trails. • Prohibit motorized use and horseback riding on all trails. • Collect monthly visitor use data on all 3 trails.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Hire a new visitor services and maintenance staff (see appendix E) to plan and implement new and/or improved refuge facilities, increase and enhance visitor and outreach programs, and other expanded public uses and outreach identified under goals 3 and 4. • Conduct a Visitor Services Review and trail assessment and develop a detailed Visitor Services Plan according to Service guidelines. • Prioritize list of improvements and new construction noted below and implement projects as funding allows. • Improve Woodmarsh Trail and Trailhead as described in the chapter narrative under goal 3, objective 3.4. • Develop a trail leading from the Woodmarsh Trail-Sycamore Road kiosk to the end of Sycamore Road and the Potomac River overlook. Build a viewing platform overlooking River if feasible and would not impact archeological resources. Allow foot travel as the only mode of transportation on new trail segment. • Develop Treestand Road as a trail that connects Woodmarsh and Great Marsh trails. Create marsh viewing area if minimal vegetation would be impacted. Allow foot travel as the only mode of transportation on Treestand Road Trail. • Collect visitor use data, according to Service guidance, to determine the number of visitors and their activities.	In addition to alternative B strategies *Over the 15 years of CCP implementation:* • Consult with area wildlife photographers to determine placement of up to two photography blinds on the refuge • Develop a Little Marsh Road Trail to allow seasonal public access to the Little Marsh dike, outside the sensitive wading and waterbird nesting season. • Make Woodmarsh Trail wheelchair accessible. • Sponsor guided group wildlife observation walks on selected trails and in areas otherwise closed to the general public access.

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 3: (cont.) Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation and wildlife observation.		
Objective 3.5–Interpretation		
Strategies *Continue to* • Distribute general refuge brochure and post at kiosks • Maintain interpretive and refuge information at the three kiosks located at the Woodmarsh trailhead, the Woodmarsh trail near Sycamore Road, and the Great Marsh trailhead. • Install interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities • Work with the Mason Neck State Park to support the annual Eagle Festival in April, including providing guided refuge tours. • Coordinate with the National Park Service to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations. • Work with the Mason Neck Area Managers Working Group to complete the joint agency information kiosk on Gunston Road to orient visitors to Peninsula and provide information about each agency.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Develop Visitor Services Plan to address the agency mission, refuge purpose and goals, infrastructure, and specific Service and Regional emphasis. Include message and actions described in chapter narrative under goal 3, objective 3.5. • Add, move, replace, or update refuge signs to conform to Service standards. Install appropriate welcome and directional signs, trailblazer signs, trailhead signs, waysides, and other required signs. • In coordination with VDOT, install standard State highway directional Trailblazer signs to the refuge on I-95 and US Route 1. • Use trained volunteers and Friends Group members to conduct onsite and offsite interpretive programs and interpretive walks. • Explore option of installing a Travelers Information System (AM radio station).	In addition to alternative B strategies *Over the 15 years of CCP implementation:* • Develop and install interpretive materials at kiosks or for use in self-guided tours to provide other-than-sight sensory wildlife experiences: e.g. sound, touch, or smell stations. • Partner with Mason Neck State Park to conduct joint interpretive programs and • Develop interpretive waysides on High Point Trail.
Objective 3.6–Environmental Education		
Strategies *Continue to* • Allow Thomas Jefferson High School to conduct educational activities along High Point, Anchorage, and Sycamore Roads, including their successive year study of: ◆ Vernal pools ◆ Deer pellet counts. • Facilitate other environmental education opportunities upon request.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Partner with Mason Neck State Park to integrate education programs into the existing teachers' workshops being offered at the Park's Visitor Center. • Provide information to educators upon request that supports State curriculum standards and emphasizes key refuge themes related to habitat management for species of concern, and Regional/National themes such as connecting children to nature and climate change. • Rehabilitate the old environmental education site and trail for use by teacher-led groups • Encourage Friends Group and volunteers to work with local schools and other educational institutions to enhance utilization of refuge resources for educator-led environmental education programs; support development of basic lesson plans with these partners. • Support use of the refuge by Fairfax County School District for science curriculum activities.	In addition to alternative B strategies *Over the 15 years of CCP implementation:* • Conduct at least two annual teacher workshops on refuge to promote its use as an outdoor classroom. • Design a senior, Elderhostel, or other adult environmental education program • Work with Fairfax County to develop public school curriculum based on refuge resources. • Become a Schoolyard habitat mentoring site.

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 4: Enhance efforts to promote awareness, understanding and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.		
Objective 4.1–Volunteers		
Strategies *Continue to* • Use volunteers on an opportunistic basis to support refuge programs. • Develop community service projects to support Fairfax County court system. • Use volunteers in refuge cleanup activities, special events, routine maintenance of trails, roads, and other areas; invasive plant control; bald eagle and other bird counts. • Develop projects for the Boy Scouts and the Girl Scouts upon request. • Issue the monthly refuge complex volunteer newsletter to identify current and upcoming events. • Develop and implement annual volunteer recruitment, training, and appreciation/ recognition events.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Increase the number of volunteers though development of quality, well-organized projects. • Use citizen-science volunteer groups to conduct biological baseline studies and monitoring consistent with Service protocols. • Coordinate with other public land management agencies on the Peninsula to recruit, train, and share volunteers. • Use volunteers and Friends Group members as docents to lead interpretive walks and as general guides during peak use times (also see objective 3.5). • Allocate funds to provide special technical training to qualified volunteers to enhance their capability to assist in refuge programs. • Address desires of refuge neighbors to participate in refuge management through volunteer opportunities. • Pursue a resident volunteer program (e.g. for a retired couple); partner with other agencies in the region, if necessary, to find a suitable location for volunteer housing.	In addition to alternative B strategies *Over the 15 years of CCP implementation:* • Expand resident volunteer program to develop a site that would house multiple volunteers; work with land management agency partners on Mason Neck Peninsula to consider residential sites both on and off-refuge and to create a quality cooperative volunteer program.

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 4: (cont.) Enhance efforts to promote awareness, understanding and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.		
Objective 4.2–Community Outreach		
Strategies *Continue to* • Issue news releases to local and regional print and electronic media when newsworthy events occur; announce scheduled activities, and keep the public informed about refuge activities. • Routinely respond to written, telephone, and in-person inquiries from the public. • Maintain and regularly update contact information for partners, elected officials, the media, and the general public. • Inform refuge neighbors of refuge management activities via website, press stories, and newsletters. • Promote our successes in the local community via refuge and community events, project demonstrations, and media stories. • Utilize volunteers to participate in community events in Fairfax County where effective outreach of refuge programs can occur. • Continue to maintain the refuge website with links to newsletters, the Friends of the Potomac River Refuges, and other pertinent refuge information.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Develop and implement procedures to offer refuge "behind the scenes" tours to the media and the general public. • Create and maintain refuge-specific fact sheets. • Expand refuge outreach programs to include recognized events such as, but not limited to, International Migratory Bird Day, National Wildlife Refuge Week, and the Eagle Festival, and designed to promote wildlife-dependent recreation and natural resource education. • Work towards more informed and productive relationships with the local media; establish personal contacts at all media outlets, including radio and TV.	In addition to alternative B strategies *Over the 15 years of CCP implementation:* • Develop and implement a video/ DVD about the Potomac River Refuge Complex.
Objective 4.3–Partner Outreach		
Strategies *Continue to* • Maintain contact list and ensure regular contact with local groups, environmental groups, and other interested parties active in the Mason Neck Refuge area.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Review existing partner relationships to determine if outreach, or the dissemination of information, could be more collaborative and effective. • Review Fairfax County Tourism, Gunston Hall, and other local community organization's events schedules to see if the refuge has a role or contribution. • Seek out new partnership opportunities with museums, historical and botanical groups, civic organizations, and environmental and conservation groups to achieve mutually beneficial projects and activities	Same as alternative B

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 4: (cont.) Enhance efforts to promote awareness, understanding and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.		
Objective 4.4–Elected Official Outreach		
Strategies *Continue to* • Invite Federal, State, and local elected officials to attend and participate in outreach events held on the refuge. • Provide written or personal briefings for members of Congress, and their staff, as needed or requested, to inform them about important refuge issues.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Invite Federal, State, and local elected officials approximately once/year to attend a guided tour of the refuge, to showcase particular accomplishments, view outstanding natural resource areas, demonstrate management activities, and highlight challenges.	Same as alternative B
Objective 4.5–Research		
Strategies *Continue to* • Support inventories and research led by others, such as the Monitoring Avian Productivity and Survivorship (MAPS) station, that are a priority for the refuge, and compatible with refuge purposes, goals and objectives; use both refuge staff or volunteers as funding allows.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • In cooperation with State agency and conservation partners, identify the highest priority research and inventory needs for the refuge and the Mason Neck Peninsula which will further conservation and management of Federal trust resources. • With priority research needs identified, work with partners to develop project specific research goals, study design and methodology and opportunities for alternative sources of funding. • Facilitate the publication and dissemination of refuge research results; consider opportunities to write for lay audiences to the extent possible, in addition to the scientific community.	Same as alternative A

Alternative A— Current Management	Alternative B— Improved Management for Federal Trust Resources (Service-preferred Alternative)	Alternative C— Enhanced Public Use Management
Goal 5: Enhance efforts to protect and interpret refuge cultural resources.		
Objective 5.1–Archeological Resources		
Strategies *Continue to* • Limit public access to designated trails in certain areas to keep visitors away from known archeological sites on the refuge. • Coordinate with the Service's Regional Archeologist to determine the level of consultation required in conjunction with refuge projects that have a potential to affect archaeological resources. • Conduct archaeological reviews, surveys, or studies of project areas as needed, or recommended, by the Service's Regional Archeologist. • Monitor known archeological sites for looting and trespass.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Complete refuge wide inventory with GPS data for known archaeological sites and resources. • Work with State and county archaeologists and avocational archeological societies willing to assist in performing targeted surveys to locate and evaluate shoreline sites at risk. Ensure archaeological resources are protected from looting. Develop site management and protection plans as warranted. • Ensure that at least one law enforcement staff person receives ARPA training. • Facilitate research on the refuge to achieve cultural resource protection and conservation objectives. • Use proposed new Sycamore Road Trail as an opportunity to interpret archeological sites. • Raise awareness of the importance of protecting cultural resources through outreach and interpretive information and programs. • Design any new refuge trails, overlooks, or other amenities to avoid impacts to archeological resources. • Conduct targeted surveys with subsurface testing to identify more of the many unrecorded sites likely to be on the refuge and to evaluate their condition and any threats. • Ensure that an ARPA message is incorporated into refuge brochures and on interpretive signs at trailheads, including those produced by refuge partners.	In addition to alternative B strategies: *Over the 15 years of CCP implementation:* • Develop a prioritized program to perform additional surveys and research as funding allows; including a systematic program to monitor erosion impacts on resources.
Objective 5.2–Historical Resources		
Strategies *Continue to* • Limit public access to designated trails to keep visitors away from historic sites on the refuge. • Provide interpretation of historic importance of refuge in refuge brochures and kiosks. • Monitor known historical sites for looting and trespass.	In addition to alternative A strategies *Over the 15 years of CCP implementation:* • Use proposed new Sycamore Road trail as an opportunity to interpret historic resources on the refuge with sensitivity to ensure they remain protected. • Work with Mason Neck State Park and Gunston Hall to develop appropriate historical resources brochures and signage.	In addition to alternative B strategies *Over the 15 years of CCP implementation:* • Develop a prioritized program to perform additional surveys and research as funding allows; including a systematic program to monitor erosion impacts on resources. • Work with partners to seek research and other grants or supplemental funding to conduct priority projects.

Part Two—Featherstone Refuge CCP Alternatives

Actions Common to Both Featherstone Refuge CCP Alternatives

There are some common actions we would undertake in managing Featherstone Refuge over the next 15 years, regardless of which CCP alternative we select. Some actions are required by law or policy, or they may be administrative actions that do not necessarily require public review, but we want to highlight them in this public document. They may also be actions we believe are critical to achieving the refuge's purpose, vision, and goals.

Those actions common to all alternatives are:

- Coordinating with Refuge partners, Friends, and the Prince William County community
- Protecting Federal-listed and recently de-listed species
- Controlling pest plants and animals
- Monitoring and abating wildlife diseases
- Supporting biological research and investigations
- Distributing Refuge Revenue Sharing payments
- Protecting cultural resources

Coordinating with Refuge Partners, Friends of Potomac River Refuges, and the Prince William County Community

We would continue to inform and coordinate with our refuge partners, including the Friends of Potomac River Refuges, VDGIF conservation officers, and Prince William County, in continuing efforts to protect the integrity of refuge wildlife and habitats and to identify opportunities for engaging the local community in stewardship of refuge resources.

Protecting Federal-listed and Recently De-listed Species

The bald eagle was recently removed from the Federal list of threatened and endangered species. However, it remains a focal species for the refuge and it continues to be protected under the Migratory Bird Treaty and Bald and Golden Eagle Protection Acts, as well as State of Virginia law. We would continue to protect bald eagles as a priority on the refuge under all alternatives. There are currently no active nesting pairs on the refuge; the last nesting pair documented was in 1996. However, at least one pair has been active in the vicinity of the refuge since the early 1990s. We would continue to work cooperatively with VDGIF to monitor for nesting and breeding activity and prohibit the public from disturbing them.

The Service has identified one Federal-listed aquatic invertebrate, the dwarf wedgemussel (*Alasmidonta heterodon*–endangered), and three Federal-listed plants—sensitive joint-vetch (threatened), small whorled pogonia (threatened), and harperella (*Ptilimnium nodosum*–endangered)—as occurring in Prince William or adjacent counties. None, however, have been documented on the refuge. The dwarf wedgemussel is known to occur in the Lower Potomac watershed which is downriver from Featherstone Refuge. It is possible that one of these four listed species may be present on the refuge. We would continue to support partner-led efforts to survey for them. If located, we would work with the respective species' Recovery Team and other experts to develop protection measures.

Controlling Pest Plants and Animals

The establishment and spread of invasive plants is a significant problem that reaches across all habitat types. The unchecked spread of invasive plants threatens the biological diversity, integrity and environmental health of all refuge habitats. In many cases, these plants have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. There are many plans, strategies, and initiatives

targeted toward more effective management of invasive species, including *The National Strategy for Management of Invasive Species* for the National Wildlife Refuge System (2003), *Silent Invasion—A Call to Action* by the National Wildlife Refuge Association (2002), and *Plant Invaders of Mid-Atlantic Natural Areas* by the Service and the National Park Service (2002). Guidance for managing invasive species on refuges is found in the Service Manual (620 FW 1.7G).

We, or our partners, would continue to treat invasive plants as needed using mechanical (e.g. mowing or trimming), biological, and cultural (e.g. hand-pulling) methods, as well as herbicides. Only herbicides approved by the Regional Contaminant Coordinator will be used, and only in accordance with approved rate and timing of application. Consideration of impacts on target and non-target species is part of the approval.

With regards to pest animals, we, or our partners, would continue to use both non-lethal and lethal control measures, as warranted, to control problem animals. Lethal control would only be conducted by refuge staff, their agent or contractor, to achieve a specie management objective. As such it would be considered a management or administrative activity and not subject to compatibility review.

Monitoring and Abating Wildlife Diseases

The Service Manual chapter on Disease Prevention and Control is not yet published. Until it is, we derive guidance on this topic from the Refuge Manual and specific directives from the Director of the Fish and Wildlife Service or the Secretary of the Interior. Refuge Manual 7-RM-17.3 lists three objectives for disease prevention and control:

1) To manage wildlife populations and habitats so the likelihood of disease contraction and contagion are minimized;

2) To provide for early detection and identification of disease mortality when it occurs; and

3) To minimize losses of wildlife from disease outbreaks.

These objectives were published in 1982. Since that time, in addition to diseases that cause serious mortality among wildlife, significant attention has been given to those diseases that are transmitted through wildlife to humans. Lyme disease transmitted by ticks, and West Nile virus transmitted by mosquitoes, are examples.

A serious wildlife disease receiving considerable attention worldwide is avian influenza. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, all refuges were instructed to prepare an Avian Influenza Surveillance and Contingency Plan. The plan covering the Refuge Complex was approved in July 2006 (USFWS, 2007a). It discusses methods for dealing with this disease should it ever be identified on the refuge.

Another disease of significant concern to both the Service and VDGIF is chronic wasting disease (CWD). It attacks the brain and spinal cord of deer, elk and moose and is typically fatal. While the exact cause is unknown, it is believed to be caused by a prion, an altered protein that causes other normal proteins to change and cause sponge-like holes in the brain. CWD was first identified in the 1960s in a Colorado research facility and since that time it has been found in Wisconsin, Wyoming, Nebraska, New Mexico, South Dakota, Illinois, Utah, Kansas, Minnesota, Montana, Oklahoma, New York, West Virginia and Canada. Prion diseases, like CWD, do not move easily between species. There is no

scientific evidence that CWD has been transmitted to animals other than deer, elk and moose. The VDGIF is conducting active surveillance for (CWD) during deer hunting seasons. To establish whether CWD occurs in Virginia, VDGIF commenced statewide CWD surveillance in 2002. Deer have been sampled from every county in the Commonwealth. CWD was documented in white-tailed deer in Frederick County, Maryland, near the Virginia/West Virginia border in 2009. We developed a CWD plan for the Refuge Complex in 2006.

Supporting Research and Investigations

Guidance on conducting and facilitating research and investigations on refuges is found in the Refuge Manual and the Service Manual. In 1982, the Service published three objectives for supporting research on units of the Refuge System in the Refuge Manual (4 RM 6.2):

1) To promote new information and improve the basis for, and quality of, refuge and other Service management decisions;

2) To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general; and

3) To provide the opportunity for students and others to learn the principles of field research.

In 2006, the Service Manual (603 FW 1.10D (4)) provided supplemental guidance in terms of the appropriateness of research on refuges, as follows: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research."

All research conducted on the refuge by others must be determined in writing to be both appropriate and compatible before a special use permit is issued to allow the activity. As noted in chapter 2—Affected Environment, we have found several research projects to be appropriate and compatible. We expect that additional opportunities to conduct research on the refuge will arise in the future. In making determinations on the appropriateness and compatibility of future research proposals, we will follow guidance in the Refuge and Service Manuals, and will employ the following general strategies:

- Seek qualified researchers and funding to help answer refuge-specific management questions;

- Participate in appropriate multi-refuge studies conducted in partnership with the U.S. Geological Survey;

- Facilitate appropriate and compatible research by providing temporary housing and equipment, if available, for persons conducting field work; and,

- Pursue peer-reviewed publications of research, and/or insure the Service is acknowledged as a contributor in research conducted on the refuge by others.

Generally, we will approve permits for research projects that provide a direct benefit to the refuge or that will strengthen our decisions on managing natural resources for biological or public use programs on the refuge. The refuge manager also may consider requests that do not relate directly to refuge objectives, but instead relate to the protection or enhancement of native species and biological diversity in the region and support the goals of ecoregional conservation teams, such as the Atlantic Coast Joint Venture.

All researchers will be required to submit detailed research proposals following the guidelines established by Service policy and refuge staff. Special use permits will also identify the schedules for progress reports, the criteria for determining when a project should cease, and the requirements for publication or other interim and final reports. All publications will acknowledge the Service and the role of Service staff as key partners in funding and/or operations. We will ask our refuge biologists, other divisions of the Service, USGS, select universities or recognized experts, and the VDGIF to peer review and comment on research proposals and draft publications, and will share research results internally, with these reviewers, and other conservation agencies and organizations. To the extent practicable, and given the publication type, all research deliverables will conform to Service graphic standards.

Some projects, such as depredation and banding studies, will require additional Service permits. The refuge manager will not approve those research projects until all required permits are received and the consultation requirements under the Endangered Species Act have been met.

Distributing Refuge Revenue Sharing Payments

As we described in chapter 2, we pay Prince William County refuge revenue sharing payments based on the acreage and the appraised value of Featherstone Refuge lands. These annual payments are calculated by formula determined by, and with funds appropriated by, Congress and authorized under the Refuge Revenue Sharing Act (16 U.S.C. 715s). All of the alternatives would continue those payments in accordance with the law, commensurate with changes in the appraised market value of refuge lands, or new appropriation levels dictated by Congress.

Protecting Cultural Resources

We would evaluate the potential for projects to impact archeological and historical resources, in consultation with the Regional Archeologist and/or SHPO to ensure compliance with Section 106 of the National Historic Preservation Act. That compliance may require any or all of the following: a State Historic Preservation Records survey, literature review, or field survey. In addition to surveys and reviews, we will also seek to minimize adverse impacts to eligible archaeological sites through public access restrictions and monitoring by law enforcement. For all archaeological sites on the refuge, preservation in place is our preferred treatment.

Conducting Additional NEPA Analysis

For all major actions, NEPA requires site-specific analysis and disclosure of their impacts, either in an environmental assessment (EA) or an environmental impact statement (EIS). NEPA categorically excludes other, routine activities from that requirement. Generally, those include administrative actions listed in chapter 4. Most of the major actions proposed in the alternatives and fully analyzed in this draft CCP/EA are described in enough detail to comply with NEPA, and would not require additional environmental analysis. Although this is not an all-inclusive list, the following project examples fall into this category: biological inventories and monitoring; pursuing safe public access to refuge lands and parking which would facilitate public use on the proposed trails for wildlife observation and nature photography, and fishing in designated areas, construction of identified public use facilities, and controlling invasive plants and animal pests.

Examples of actions not analyzed in enough detail in this document to comply with NEPA is our proposal under alternative B to consider hunting consistent with state seasons. If Alternative B is selected for implementation, within five years, we would evaluate in detail a proposal to offer hunting in cooperation with VDGIF. That evaluation would include a separate NEPA document, including an evaluation of other alternatives and public involvement, before making a decision.

Featherstone Refuge Alternative A—Current Management

Alternative A represents continuing our current management of Featherstone Refuge for the next 15 years. It provides the baseline for comparing alternatives B and C. Under alternative A, the refuge would remain closed to the public due to the lack of parking and safe and legal public access. Law enforcement would be the primary activity conducted on the refuge. Habitat and wildlife management would continue to be limited to actions necessary to monitor and protect sensitive nesting areas, or address critical issues, such as a major outbreak of invasive pests, pathogens, invasive plants or wildlife disease. Research requests would continue to be evaluated on a case-by-case basis. We would also continue to administer this refuge from our headquarters in Woodbridge, Virginia.

GOAL 1:

Protect forest, wetland, and shoreline habitats to support native wildlife and plant communities including species of conservation concern.

Objective 1.1 Mature Hardwood-mixed Forest Habitat and Associated Native Wildlife

Continue to protect the 80 acres of forested habitat on the refuge, with emphasis on providing habitat for bald eagles and other birds of conservation concern.

Rationale
See rationale for alternative B, goal 1, objective 1.1.

Strategies
Continue to
- Cooperate with VDGIF in monitoring bald eagle activity on the refuge
- Address injurious or nuisance wildlife as problems arise
- Address issues of invasive plants as problems arise

Objective 1.2 Shoreline Protection, Wetlands, and Water Quality

Continue to protect the 220 acres of wetlands on the refuge and its 2.2 miles of shoreline to maintain their integrity and protect their habitat values.

Rationale
See rationale for alternative B, goal 1, objective 1.2.

Strategies
Continue to
- Prohibit public access to refuge shoreline and wetlands
- Use refuge law enforcement to conduct outreach and enforce restrictions

Objective 1.3 Interjurisdictional and Federal Trust Fisheries

Continue to cooperate with partners to research or monitor interjurisdictional and Federal trust fisheries, and other aquatic species of concern, on the refuge and in surrounding waters.

Rationale
See rationale for alternative B, goal 1, objective 1.3.

Strategies
Continue to
- Provide assistance, typically logistical, to research partners upon request, to facilitate their research on fish and other aquatic species in the tidal Potomac River

GOAL 2:

Provide compatible, wildlife-dependent recreational opportunities to increase the enjoyment and appreciation of the refuge's resources to visitors and nearby residents.

Objective 2.1 Public Access

Continue to prohibit public access due to a lack of safe public access and parking.

Rationale
Since its establishment in 1979, the refuge has never been open to public access because there is no public parking area with provisions for a safe pathway from the parking area to the refuge.

Over the years, we have considered several options for public access, but none were determined practicable or feasible. The existing Service easement (allowing administrative access only) to the north of the refuge is often suggested, but it exits at a residential neighborhood that could not be used for parking. Building a parking area on the refuge proper would not be feasible given the relatively small size of the refuge and the extent of its wetlands. There is a public parking area at the VRE station that has been suggested for use, but there is no viable option for safely traversing the railroad tracks between the lot and the refuge. We continue to work with Prince William County to explore options as noted in the "Actions Common to Alternatives B and C Only" section of this chapter.

Strategies
Continue to
- Prohibit public access due to lack of safe public access and parking
- Use law enforcement officers to reduce trespass issues

Objective 2.2 Hunting

No program on the refuge due to a lack of safe public access and parking.

Rationale
Allowing hunting on the refuge is not feasible because of the lack of safe public access as described under objective 2.1.

Strategies
Continue to
- Coordinate with VDGIF conservation officer in addressing any illegal hunting issues

Objective 2.3 Recreational Fishing

No program on the refuge due to a lack of safe public access and parking.

Rationale
Allowing fishing on the refuge is not feasible because of the lack of safe public overland access as described under objective 2.1.

Strategies
Continue to
- Coordinate with the VDGIF conservation officer in addressing any illegal fishing issues

Objective 2.4 Wildlife Observation and Photography

No programs on the refuge due to a lack of safe public access and parking.

Rationale
Supporting wildlife observation and photography on the refuge is not feasible because of the lack of safe, public access as described under objective 2.1.

Objective 2.5 Interpretation

No program on the refuge due to a lack of safe public access and parking.

Rationale
Supporting an interpretation program on the refuge is not feasible because of the lack of safe public access as described under objective 2.1.

Objective 2.6 Environmental Education

No program on the refuge due to a lack of safe public access and parking.

Rationale
Supporting an environmental education program on the refuge is not feasible because of the lack of safe public access as described under objective 2.1.

GOAL 3: **Promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.**

Objective 3.1 Volunteers

No program on the refuge due to a lack of safe public access and parking.

Rationale
Supporting a quality volunteer program on the refuge is not feasible because of the lack of safe public access as described under objective 2.1.

Objective 3.2 Community Outreach

Continue outreach to the local community via the media when newsworthy events occur, and through contacts with law enforcement officer.

Rationale
Because there is no authorized public access, we strive to find alternative ways to educate the public about Featherstone Refuge and keep local communities informed about its resource values other than using onsite programs.

Strategies
Continue to

- Inform visitors at other units of the Refuge Complex and local residents about Featherstone Refuge and its resources through the media, interpretive materials available at Occoquan Bay Refuge visitor contact facility, and our website
- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities
- Respond to inquiries written, telephoned, or made in person by the public

Objective 3.3 Elected Official Outreach

Continue to inform elected officials representing the refuge area about Refuge Complex priorities and planning for Featherstone Refuge.

Rationale
We seek support from elected officials for all our Refuge Complex programs. With regards to Featherstone Refuge, it is important we clarify to those officials why the refuge has remained closed and what management issues we face.

Strategies

- Continue to provide written or personal briefings for local officials and members of Congress or their staffs, as needed or as requested, to inform them about important events or about issues affecting the refuge.

Objective 3.4 Research

Continue to facilitate compatible research opportunities to support management decisions.

Rationale
We need to support compatible, partner-led research that would help us maintain the wildlife and habitats at Featherstone Refuge or that contribute to addressing regional issues of concern to the Service.

Strategies

- As opportunities arise, support research that is compatible with refuge purposes, goals and objectives

Alternative B (Enhanced Management) is the Service-preferred alternative. Under alternative B, the Service would build off the wildlife and habitat actions in alternative A. Increased emphasis would be on monitoring and protecting

Featherstone Refuge Alternative B—Enhanced Management (Service-preferred Alternative)

sensitive areas from human disturbance, such as the refuge shoreline and riparian forest habitats. In addition, monitoring and controlling invasive plants, pests, and pathogens to avoid catastrophic loss or degradation of habitat would remain a priority. As funding, staffing, or partner assistance allows, we would also collect refuge habitat data, such as locations of vernal pools and nesting sites, to include in a GIS database. Research by partners would also be encouraged to support refuge goals and objectives, enhance our understanding of Federal trust resources, or address issues of concern.

Under alternative B, the Service would continue to pursue and evaluate options with Prince William County and other stakeholders to secure public parking, and safe and legal public access to the refuge--an issue since the refuge was established. In addition, many stakeholders are seeking a means to establish segment of the PHNS Trail on the Refuge, contributing to a concept of a continuous network between the Mount Vernon Trail (in southern Fairfax County) and Prince William Forest Park.

Once public access is secured, and we have additional staff to effectively manage a visitor program, we would provide opportunities for wildlife observation and nature photography on designated refuge trails, and fishing at designated sites. New proposed infrastructure construction would be contingent on available funding. Map 3.3 depicts potential locations for new public use infrastructure. Within 5 years we would also evaluate in detail a proposal to provide opportunities for hunting in cooperation with VDGIF. Other alternatives, including no action, would be considered in the hunt program evaluation, and there would be public involvement before making a final decision.

Boundary marker on Featherstone refuge

USFWS

Map 3.3. Proposed Public Use Features at Featherstone Refuge

Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect forest, wetland, and shoreline habitats to support native wildlife and plant communities including species of concern.**

Objective 1.1 Mature Hardwood-mixed Forest Habitat and Associated Native Wildlife

Monitor habitat conditions and protect sensitive areas from human disturbance on the refuge's 80 forested acres, with emphasis on nesting bald eagles, migratory birds, and other species of conservation concern identified in the Virginia Wildlife Action Plan.

Rationale

Sustaining a contiguous, healthy, and diverse mature hardwood-mixed forest on Featherstone Refuge contributes to migratory bird conservation due to the refuge's location in a highly urbanized area. Remaining coastal forests and woodlands within BCR 30, like those on the refuge, provide stopover sites during migration and overwintering for neotropical migrants (Steinkamp, 2008). Within BCR 30, forested upland communities provide habitat for the second highest number of priority bird species in the region (USFWS, 2007). Destruction and fragmentation of forests in both breeding and wintering areas are factors in the decline in forest bird species abundance (Roth et. al., 1996). Many of these declining species are also associated with dense understory conditions created by local disturbance. These conditions have become less common due to a lack of forest management and over-browsing by white-tailed deer (Rich et al., 2004).

Management at Featherstone Refuge would be focused on protecting habitat for bald eagles and other migratory birds of conservation concern. Because of its size, the refuge only minimally contributes to conserving habitat for forest interior dwelling (FIDs) neotropical bird species which are regionally in decline due to habitat loss and fragmentation. FIDs species require large contiguous forested tracts to maintain viable populations. These species require a minimum habitat patch size of at least 50 acres in size with 10 or more acres of "forest interior" habitat (i.e., forest greater than 300 feet from the nearest forest edge) (Jones et al., 2000). However, the 50-acre minimum habitat patch size is only capable of supporting less area-sensitive FIDs species; more area-sensitive species require larger continuous forest patches. Larger patches also increase the probability of supporting a diversity of productive breeding pairs.

FIDs such as wood thrush, Acadian flycatcher, and scarlet tanagers are known to occur on the refuge and are listed as birds of conservation concern by various authorities (appendix A). According to the PIF Area 44 Plan, the BCR 30 plan, and Virginia WAP, other birds species of conservation concern that would benefit from a diverse, mature, mixed-deciduous forest include raptors such as red-shouldered hawk (*Buteo lineatus*) and cavity-nesting birds such as pileated (*Dryocopus pileatus)* and red-bellied woodpeckers (*Melanerpes carolinus)* (Rosenberg et al., 1999; PWCA, 2008).

Among a number of management recommendations for forest birds made by the ACJV in the BCR 30 Plan are:

- Increase/improve active management of forests to improve habitat quality within existing and high priority upland forest (e.g., loss of shrub layer).

- Manage upland forest communities to provide post-fledging habitat (e.g. a habitat mosaic, including shrubby areas and openings; targeted species is the wood thrush).

- Develop and implement programs to control invasive plant species.

Bald eagle conservation also continues to be a priority on the refuge since their protection was a key reason for refuge establishment. After four decades of protection under the Federal Endangered Species Act, the bald eagle was officially removed from the Federal list of endangered and threatened wildlife in 2007. However, they are still protected under the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Bald eagles also continue to be listed as species of concern in Virginia.

The refuge shoreline provides important foraging and perching habitat for bald eagles. Although the refuge does not currently support any breeding pairs of bald eagles, it has previously and will hopefully again in the future as Virginia's eagle population continues to grow. There are active pairs in the vicinity of the refuge. The State's population has steadily increased from a low of 33 nests in 1970 to current numbers of nearly 550 pairs in Virginia's Coastal Plain, and over 1,000 pairs throughout the Chesapeake Bay region.

For more than 30 years, the VDGIF has cooperated with the Service, with academic and research partners—the Center for Conservation Biology (CCB) at The College of William and Mary, in particular—and with public and private landowners to achieve and document recovery of bald eagles. Both VDGIF and the Service remain committed to protecting bald eagles to ensure that a healthy population can be sustained. Widespread urban sprawl and habitat destruction in the Coastal Plain pose serious risks to some of the region's best eagle nesting, foraging, and roosting habitat. To address these and other threats, both agencies have developed management guidelines: the Virginia Bald Eagle Management Guidelines (2007) and the Service's National Bald Eagle Guidelines (2007). Under alternative B, we would support VDGIF in implementing both agencies' guidelines as they apply to Featherstone Refuge.

The refuge's forests also provide habitat for native mammals, amphibians and reptiles. Appendix A presents a listing of all species thought to occur on the refuge. Of the reptile species that likely to occur, three are listed by the Virginia WAP as species of conservation concern, including the eastern hog-nosed snake (Tier IV), spotted turtle (Tier III) and eastern box turtle (Tier III).

Strategies
Continue to
- Cooperate with VDGIF in monitoring bald eagle activity on the refuge

Over the 15 years of CCP implementation
- Identify potential habitat improvements for bald eagle, waterfowl, or other migratory birds

- Identify partners to conduct surveys of neotropical migratory birds and other birds of concern;

- Enlist USDA–FS, State or conservation organizations with ecological expertise, to conduct forest health and condition inventory and identify any significant threats;

- Map in GIS, and protect from adverse impacts, any vernal pools or other unique habitat features;
- Inventory invasive plant species and prioritize their treatment;
- Use chemical, mechanical, biological, hand-pulling or prescribed fire treatments as warranted;
- Address injurious or nuisance wildlife as problems arise
- Hire additional wildlife program staff as outlined in appendix E—staffing chart to plan, implement, and monitor biological program

Objective 1.2 Shoreline Protection, Wetlands, and Water Quality

Protect the refuge's 220 acres of wetlands and its 2.2 miles of shoreline to maintain their integrity and protect their habitat values.

Rationale

Adopting measures to monitor and evaluate shoreline erosion, and minimize other threats to the integrity of the shoreline, is important to protecting refuge lands. Once lost, attempting to restore segments of river shoreline would be tremendously expensive and may be infeasible. However, shoreline protection will be evaluated within the context of climate change and sea level rise to determine the feasibility of shoreline protection projects.

Minimizing impacts to water quality and wetlands is also vital to maintaining the integrity, and sustaining the health and diversity of refuge habitats and wildlife populations over the long-term. Water quality impacts may come from contaminant in water draining the landward side upgradient of the refuge in the Farm Creek and other smaller drainages and from stormwater flows immediately adjacent to the refuge. From the Potomac River side, impacts may come from contaminants in the river water. The refuge has no water quality data regarding the upland side drainages. The tidal Potomac River is monitored by the EPA and surrounding jurisdictions for a variety of water pollutants and sources.

Section 303(d) of the Federal Clean Water Act requires Virginia to: (1) identify waters, known as water quality limited segments (WQLSs), where technology-based effluent limitations and other required controls cannot achieve water quality standards; (2) for each listed water, establish Total Maximum Daily Loads (TMDLs) for pollutants preventing the attainment of water quality standards; and (3) offer an opportunity for public review and comment on the proposed TMDLs.

Featherstone Refuge is located in the Upper Tidal portion of the Potomac River. The Virginia Department of Environmental Quality (VA DEQ, 2008) has identified the waters of the Potomac River Lower Tidal, Potomac River Middle Tidal, and Potomac River Upper Tidal on the State's 303(d) List as impaired by nutrients (1996), sediments (1996), toxics (PCBs found in fish tissue (2002), and impacts to biological communities (2004 and 2006) (Potomac River Lower and Middle Tidal only). Additionally, the Potomac River Lower Tidal was listed as impaired by bacteria in 2004, the Potomac River Middle Tidal was listed as impaired by metals (cadmium, chromium, copper, and lead) in 1996, and the Potomac River Upper Tidal was listed as impaired by metals (copper) in 1996 and impacts to biological communities in the non-tidal portions of the basin in 2006. A TMDL for fecal coliform to address the Potomac River Lower Tidal 2004 bacteria

listing was approved by the EPA in 2005, a water quality analysis (WQA) for cadmium, chromium, copper, and lead to address the Potomac River Middle Tidal 1996 metals listing was approved by the EPA in 2006, and a WQA for copper to address the 1996 metals listing was approved by the EPA in 2006.

We would work with the VDGIF to address these water quality issues.

Strategies
Over the 15 years of CCP implementation

- Monitor areas of substantive loss and work with experts to determine the feasibility of projects to mitigate shoreline erosion and wetlands impacts within the context of sea level rise.
- Seek funding to implement priority projects assuming they are practical and feasible, cost effective, and commensurate with resource values
- Facilitate a citizen science-based water quality monitoring program if an interest and a long-term commitment are present
- Work with VADCR-Division of Natural Heritage and other experts to conduct inventories for rare, threatened, and endangered plants species in Great Marsh. Potential species occurring in the marsh include sensitive joint-vetch, Parker's pipewort, and river bulrush.

Objective 1.3 Interjurisdictional and Federal Trust Fisheries

Support the Service's Fisheries Program, VDGIF, and other partners' efforts to manage, protect, and monitor interjurisdictional and Federal trust fisheries and other aquatic resources of conservation concern on the refuge and in surrounding waters.

Rationale
Interjurisdictional fisheries are freshwater, coastal, or marine fish populations managed by two or more States, nations, or Tribal governments because of their geographic distribution or migratory patterns (USFWS, 2002). In addition, the Region 5 Fisheries Program includes the following guidance,

> "Interjurisdictional fisheries must be under the jurisdiction of and managed by two or more states, nations, or tribal governments. The general standard for inclusion in this category is the existence of an interagency management plan among two or more states, nations or tribal governments or other similar formal agreement that specifically identifies the native species or population of interest and identifies a role for the Fish and Wildlife Service; and the Fisheries Program has or intends to have a consistent commitment to species restoration as evidenced by approval by Region 5 Fisheries (or higher level within the Fish and Wildlife Service). Interjurisdictional species or populations not covered by such a plan or agreement will be considered on a case-by-case basis *(http://www.fws.gov/northeast/fisheries/).*"

The tidal Potomac River and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Neabsco Creek) the smaller streams that include Farm Creek, and the marshes along the Virginia shoreline for habitat. Interjurisdictional fish listed as species of concern by the VDGIF (VCWCS, 2005) include the shortnose sturgeon (a Federal-listed endangered species and a listed by VDGIF as Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV) and American eel (Tier IV).

It will be important to coordinate the strategies in this objective with VDGIF, and other State and Federal agencies and organizations with jurisdiction or a mission to protect these resources. For example, the National Marine Fisheries Service (NMFS), and the Service's Fisheries Program Office in Virginia would be a key partners in meeting this objective. As would the Potomac River Fisheries Commission (PRFC), which regulates, and issues licensees for, all recreational and commercial fishing, crabbing, oystering and clamming in the main stem tidal Potomac River. The PRFC also coordinates regulations with the Maryland Department of Natural Resources (DNR), the Virginia Marine Resources Commission (VMRC) and VDGIF, and with the other Atlantic coastal states through the Atlantic States Marine Fisheries Commission (ASMFC).

Strategies
Continue to
- Provide assistance, typically logistical, to research partners upon request, to facilitate their research on fish and other aquatic species in the tidal Potomac River

Over the 15 years of CCP implementation
- Assist VDGIF, NMFS, the Service's Virginia Fisheries Program office, and other Federal and State agencies, when needed, to address interjurisdictional fish issues related to the waters of the refuge and the Potomac River.

GOAL 2: **Provide compatible, wildlife-dependent recreational opportunities to increase the enjoyment and appreciation of the refuge's resources to visitors and nearby residents.**

Objective 2.1 Public Access

Continue to work with Prince William County and other stakeholders to establish safe public parking and access.

Rationale
As we described in chapter 2, we do not currently allow public access to the refuge because we are unable to provide parking and safe, legal access to the refuge. This is essential to implementation of visitor programs on this refuge. It is important to recognize, however, that once parking and legal access is secured, we would also need to construct trails in locations that minimize impacts to natural resources. Unfortunately, there are very few options to develop public access, given the refuge's location between a residential single-family area, an industrial park, a high density housing development, and an active railroad line. However, we would continue to actively explore all possibilities as we describe below.

We have heard recommendations to open the refuge to those who live within walking distance or to boaters who can access the refuge from the water, as neither of these user groups would require parking. We do not believe that providing these limited opportunities to select groups of people is in the best interest of the American public, nor an efficient use of our limited funding and staffing resources.

Given our interests in providing access to the general public, we are only aware of one viable option. This option focuses on the using the current Virginia Rail Express (VRE) parking area and platform. This has the potential to provide parking for refuge users and safe access across the CSX railroad tracks. In addition, it presents an opportunity to construct a trail from the west side of the railroad tracks to the refuge boundary and along an old roadway that has the potential to become part of the Potomac Heritage National Scenic Trail (PHNS Trail)

We would continue to discuss with Prince William County, the National Park Service (NPS), and other stakeholders, all viable options for resolving the access and parking issue and establishing and maintaining a 1.1 mile segment of the PHNS Trail through Featherstone Refuge. The PHNS Trail includes 830 miles of existing and planned trail segments linking the mouth of the Potomac River to the Allegheny Highlands with the goal of providing "… a means to explore the origins and continuing evolution of the Nation" (*http://www.nps.gov/pohe/index.htm*). The NPS is the Federal agency providing oversight and coordination for the PHNS Trail. The NPS is currently working on a Memorandum of Understanding with state and Federal partners to develop a regional trails plan in the vicinity of Featherstone refuge. The refuge would consider becoming a signatory, if there is potential to resolve the public access issue. As a multi-use facility (i.e., for foot and bicycle uses), the PHNS Trail segment would likely require an improved surface constructed according to American Association of State Highway and Transportation Officials (AASHTO) standards.

Strategies
Over the duration of the cooperative agreement

- Support Prince William County in pursuing VRE and CSX Station parking and crossover and platform access, as well as other viable options to provide safe public access
- With access and parking secured, support partner development of PHNS Trail
- Assist VDGIF in implementing other public access needs and compatible opportunities that would facilitate their management of hunting and fishing programs.
- Hire visitor service and maintenance staff as identified in staffing chart (see appendix E)

Objective 2.2 Hunting

Evaluate opportunities for a quality hunting program in partnership with VDGIF

Rationale
Members of the public and VDGIF have recommended we allow hunting on the refuge. Specifically mentioned to us are interests in waterfowl and deer hunt consistent with state seasons. At present, we have not developed a hunt program proposal to the extent that we could conduct a NEPA analysis and involve the public. Instead, within five years of CCP approval, we would identify and analyze a detailed proposal, and involve the public, before making a decision.

Hunting, if approved, would provide a priority public use in an area where public hunting opportunities are rapidly declining as development increases. The 1997 Refuge Improvement Act specifically identifies hunting as a priority wildlife-dependent recreational activity on refuges. Our particular interest in evaluating a hunt program on this refuge is similar to our reason for offering one at Mason Neck Refuge; that is, we are concerned about the impacts on native vegetation and forest regeneration from deer overbrowsing. Any negative affects on the ecological integrity, diversity, and health of the forest habitat would cause us to consider hunting as a potential management tool to minimize harmful impacts.

Strategies
Within 5 years of CCP implementation
- Evaluate in detail a proposal to provide opportunities for hunting consistent with state seasons in partnership with VDGIF. Other alternatives, including no action, would be considered in the hunt program evaluation, and there would be public involvement before making a final decision.

Objective 2.3 Recreational Fishing

Provide a quality recreational fishing opportunity at designated refuge sites.

Rationale
The 1997 Refuge Improvement Act identifies fishing as priority wildlife-dependent recreation for refuges. Fishing provides an opportunity for the Service to promote an understanding and appreciation of natural resources and their management in the Potomac River and Chesapeake Bay ecosystems and on all lands and waters in the Refuge System.

We would facilitate fishing at designated sites, in partnership with VDGIF, assuming access and staffing are secured to manage the program. Map 3.3 depicts where up to four fishing sites would be developed and designated.

By increasing the use and enjoyment of this refuge, and raising its visibility, we can better communicate its importance to wildlife and habitat. In turn, we hope this increases support for the Refuge System, and promotes stewardship of natural resources in the local community, the country, and globally.

Strategies
Over the 15 years of CCP implementation
- Within 5 years, with staffing in place, complete administrative requirements to open the refuge to fishing
- Develop up to four designated fishing sites (see map 3.3)
- Enlist assistance from VDGIF to help manage the program

Objective 2.4 Wildlife Observation and Photography

Provide self-guided wildlife observation and photography opportunities at designated locations on the refuge.

Rationale
The 1997 Refuge Improvement Act identifies wildlife observation and photography as priority wildlife-dependent recreation on refuges. These activities promote the understanding and appreciation of natural resources and their management on all lands and waters in the refuge system.

Assuming safe public access and parking is secured, and staffing and funding to construct and maintain infrastructure is in place, we would develop a self-guided wildlife observation and photography program. Our objective would be to promote an understanding of the wildlife and habitat resources of Featherstone Refuge, as well as other refuges in the Refuge Complex. Tentative locations for infrastructure are presented on map 3.3.

Strategies
Over the 15 years of CCP implementation
- Continue to pursue discussions with Prince William County on 1.1. mile segment of the PHNS Trail and public access and parking as in alternative B, objective 2.1 above

- Assuming public access is secured, pursue staffing, as indicated in appendix E, and funding to develop and maintain a self-guided wildlife observation and photography program

- Seek funding to develop infrastructure as presented on map 3.3 which includes approximately 0.75 miles of trails (in addition to the PHNS Trail) and up to four observation platforms. Trails would be surfaced with dirt or stone dust.

Objective 2.5 Interpretation

Provide informational and interpretive panels at trailheads, or other focal points of visitor activity to facilitate a self-guided experience.

Rationale

The 1997 Refuge Improvement Act identifies interpretation as priority wildlife-dependent recreation on refuges. It may include activities, talks, publications, audio-visual media, signs, and exhibits that convey key messages about natural and cultural resources to visitors. Visitors who experience interpretation have the opportunity to make their own connections to the resource leading to possible resource stewardship and the understanding of resource relationships and human impacts.

Similar to objective 2.5, once safe public access and parking is secured, and staffing and funding to construct and maintain infrastructure is in place, we would develop informational and interpretive panels at trailheads to facilitate self-guided opportunities. Occasional interpretive talks and tours would be given upon request.

Another effort underway related to potential interpretative activities on the refuge is the proposed Captain John Smith Chesapeake National Historic Trail. In September 2010, the NPS released for public review and comment the draft Comprehensive Management Plan and EA for this trail. The trail is the first national water-trail and commemorates the explorations of John Smith on the Chesapeake Bay and its tributaries in 1607-1609, tracing approximately 3,000 miles of his voyage routes.

The NPS is working with many partners to plan, develop, and manage the trail, including refuges in the Chesapeake Bay area. Other partners include the Friends of the Captain John Smith Trail, the Chesapeake Bay Gateways and Watertrails Network, Federal and State agencies, communities, nonprofit organizations, and businesses. The draft plan and EA outline how the NPS and these partners will develop component water trails, provide access to the trail, interpret the John Smith voyage, and protect the important resources related to the trail. Refuges in the Chesapeake Bay area, including the Potomac River Refuge Complex, have been coordinating with the NPS on identifying compatible opportunities on refuge lands to support this effort. We will continue to coordinate with the NPS on developing opportunities for the trail consistent with the final decision of the CCP.

Strategies

Over the 15 years of CCP implementation

- Continue to pursue discussions with Prince William County on PHNS Trail and public access and parking as in alternative B, objective 2.1 above

- Assuming public access is secured, pursue staffing, as indicated in appendix E, and funding to develop and maintain a limited self-guided interpretive program

- Encourage trained volunteers, Friends Group members, and partners to conduct interpretive walks and related programs.

- Coordinate with the National Park Service to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.

Objective 2.6 Environmental Education

Support partner-led environmental educational opportunities upon request.

Rationale
The 1997 Refuge Improvement Act identifies environmental education as priority wildlife-dependent recreation on refuges. Visitors would benefit from environmental education opportunities on the refuge. These activities would promote understanding and appreciation of natural resources and their management and would help to raise awareness, understanding, and appreciation of the role of the refuge in the tidal Potomac River and Chesapeake Bay watershed and its contribution to migratory bird conservation. We would support partner-led efforts to design and implement an environmental education program. That program could include teacher-training or on-site student programs.

Strategies
Over the15 years of CCP implementation
- Continue to pursue discussions with Prince William County on PHNS Trail and public access and parking as in alternative B, objective 2.1 above

- Assuming safe public access is secured, encourage partners to lead quality environmental educational programs, operating under a special use permit

GOAL 3: **Promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.**

Objective 3.1 Volunteers

Provide volunteer opportunities to facilitate public use, wildlife and habitat management programs

Rationale
We benefit from volunteer support of programs on the refuge. Volunteer projects also can be an effective outreach tool to increase awareness and understanding of local and regional resource concerns.

Strategies
Over the 15 years of CCP implementation
- Develop a list of volunteer opportunities and recruit for projects as needed

Objective 3.2 Community Outreach

Conduct outreach to inform the local community about programs or activities.

Rationale
Because there is no authorized public access, we strive to find alternative ways to educate the public about Featherstone Refuge, and keep the local community informed about its values to wildlife and habitat resources, other than using onsite programs. We would continue to develop and pursue community outreach activities which promote natural resource stewardship, and raise awareness of the Refuge System, the Refuge Complex, and this refuge's contribution to maintaining natural resources in the region.

Strategies
Continue to
- Inform visitors at other units of the Refuge Complex and local residents about Featherstone Refuge and its resources through the media, interpretive materials available at Occoquan Bay refuge visitor contact facility, and our website

- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities

- Respond to inquiries written, telephoned, or made in person by the public

Over the 15 years of CCP implementation
- Increase communication and outreach efforts, when needed, to enhance community relations

Objective 3.3 Elected Official Outreach

Conduct outreach to elected officials to explain management priorities or highlight management issues and challenges.

Rationale
We seek support from elected officials for all our Refuge Complex programs. It is important to keep them apprised, especially when significant new programs are implemented. Also, as issues arise, it is important to provide updates and explain how the issues are being addressed.

Strategies
Continue to
- Provide written or personal briefings for members of Congress or their staffs, as needed or as requested, to inform them about important events or about issues affecting the refuge.

Over the 15 years of CCP implementation
- Enhance outreach to Federal, State and local officials

Objective 3.4 Research

Facilitate research, monitoring, and inventory opportunities that will enhance science-based decision-making and adaptive management.

Rationale
We would encourage partner-led research that would increase our understanding of wildlife and habitats at Featherstone Refuge, or that would contribute to addressing issues of regional concern to the Service and the State.

Strategies
Over the 15 years of CCP implementation
- Identify and prioritize research and monitoring needs for the refuge

- Encourage partners to conduct research and assist them in seeking alternative funding sources

Featherstone Refuge—CCP Alternatives Comparison Table

Earlier in this chapter, in the section titled "Actions Common to Both Alternatives," we described many important actions which are not discussed in the table below. Those actions include:

- Coordinating with Refuge partners, Friends, and the Prince William County community
- Protecting Federal-listed and recently de-listed species
- Controlling pest plants and animals
- Monitoring and abating wildlife diseases
- Supporting biological research and investigations
- Distributing Refuge Revenue Sharing payments
- Protecting cultural resources

The reader is encouraged to review that section, as well as the detailed discussions in chapter 3 for each alternative, for a complete perspective on each alternative.

Table 3.2 highlights those actions that distinguish the two alternatives we analyzed in detail for Featherstone Refuge. It is also organized to show how they relate to our refuge goals, and the resources and programs of importance to the refuge. Our intent is to provide an easy way to compare and contrast the alternatives. Please refer to the glossary to interpret any acronyms.

Table 3.2 Comparison of objectives and strategies for Featherstone NWR alternatives

Alternative A Current Management	Alternative B Enhanced Management (Service-Preferred Alternative)
Goal 1: Protect forest, wetland, and shoreline habitats to support native wildlife and plant communities including species of concern.	
Objective 1.1 Mature Hardwood-mixed Forest Habitat and Associated Native Wildlife	
Strategies *Continue to* • Cooperate with VDGIF in monitoring bald eagle activity on the refuge. • Address injurious or nuisance wildlife as problems arise. • Address issues of invasive plants as problems arise; treat on limited scale as funding and staff resources allow.	In addition to alternative A strategies, *Over the 15 years of CCP implementation:* • Identify potential habitat improvements for bald eagle, waterfowl, or other migratory birds. • Enlist partners to conduct surveys of Neotropical migratory birds and other birds of concern. • Enlist USDA–FS, State or conservation organization ecological expertise, to conduct forest health and condition inventory and identify any significant threats. • Map in GIS, and protect from adverse impacts, any vernal pools or other unique habitat features. • Inventory invasive plant species and prioritize their treatment; treat via chemical, mechanical, biological, hand-pulling or prescribed fire methods as warranted. • Hire Biological program staff as identified in staffing chart (appendix E).
Objective 1.2 Shoreline Protection, Wetlands, and Water Quality	
Strategies *Continue to* • Prohibit public access to refuge shoreline and wetlands. • Use refuge law enforcement to conduct outreach and enforce restrictions.	In addition to alternative A strategies, *Over the 15 years of CCP implementation:* • Monitor areas of substantive loss and work with experts to develop projects to mitigate shoreline erosion and wetlands impacts. • Seek funding to implement priority projects assuming they are practical and feasible, cost effective, and commensurate with resource values • Facilitate a citizen science-based water quality monitoring program if an interest and a long-term commitment are present. • Hire biological program staff as identified in staffing chart (appendix E).
Objective 1.3 Interjurisdictional and Federal Trust Fisheries	
Strategies *Continue to* • Provide assistance, typically logistical, to research partners upon request, to facilitate their research on fish and other aquatic species in the tidal Potomac River.	In addition to alternative A strategies, *Over the 15 years of CCP implementation:* • Assist VDGIF, NMFS, the Service's Virginia Fisheries Program office, and other Federal and State agencies, when needed, to address issues of interjurisdictional fish related to the waters of the refuge and the Potomac River. • Hire biological program staff as identified in staffing chart (appendix E).

Alternative A Current Management	Alternative B Enhanced Management (Service-Preferred Alternative)
Goal 2: Provide compatible, wildlife-dependent recreational opportunities to increase the enjoyment and appreciation of the refuge's resources to visitors and nearby residents.	
Objective 2.1 Public Access	
Strategies *Continue to* • Prohibit public access due to lack of safe public access and parking • Use law enforcement officers to reduce trespass issues.	*Over the 15 years of CCP implementation:* • Continue discussions with Prince William County, NPS, and other stakeholders about viable options for establishing and maintaining the 1.1 mile segment of the PHNS Trail through the refuge, including resolution of the access and parking issue. • Support Prince William County in pursuing VRE and CSX Station parking and crossover and platform access, as well as other viable options. • Implement other proposed trails (approx 0.75 miles) and up to 4 observation platforms • Hire visitor service and maintenance staff as identified in staffing chart (see appendix E).
Objective 2.2 Hunting	
Strategies *Continue to* • Coordinate with VDGIF conservation officer in addressing any illegal deer hunting issues.	*Within 5 years of CCP implementation:* • Evaluate in detail a proposal to provide opportunities for hunting consistent with state seasons in partnership with VDGIF. Other alternatives, including no action, would be considered in the hunt program evaluation, and there would be public involvement before making a final decision.
Objective 2.3 Recreational Fishing	
Strategies *Continue to* • Coordinate with the VDGIF conservation officer in addressing any illegal fishing issues	*Over the 15 years of CCP implementation:* • Hire visitor services staff as outlined in appendix E to plan and implement programs. • Complete administrative requirements to formally open the refuge to fishing. • Assuming safe public access is secured, construct proposed infrastructure as indicated on map 3.3 to support fishing at designated sites. • Manage program in partnership with VDGIF
Objective 2.4 Wildlife Observation and Photography	
Strategies No program	*Over the 15 years of CCP implementation:* • Continue to lead discussions with Prince William County and NPS on PHNS Trail as in alternative B, objective 2.1 above. • Hire visitor services staff as outlined in appendix E to plan and implement programs. • Assuming safe public access is secured, construct proposed public use infrastructure as indicated on map 3.3 to support program including approx 0.75 miles of new trail and up to 4 observation platforms.

Alternative A Current Management	Alternative B Enhanced Management (Service-Preferred Alternative)
Goal 2: (cont.) Provide compatible, wildlife-dependent recreational opportunities to increase the enjoyment and appreciation of the refuge's resources to visitors and nearby residents.	
Objective 2.5 Interpretation	
Strategies No program	*Over the 15 years of CCP implementation:* ● Hire visitor services staff as outlined in appendix E to plan and implement programs. ● Assuming safe public access is secured: ◆ Install interpretive panels at key locations to explain refuge regulations and any other resource information. ◆ Encourage trained volunteers, Friends Group members, and partners to conduct interpretive walks and related programs. ● Coordinate with the National Park Service to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.
Objective 2.6 Environmental Education	
Strategies No program	*Over the 15 years of CCP implementation:* ● Assuming safe public access is secured and visitor services staff is in place as indicated in appendix E, then: ◆ Encourage partner-led programs on refuge lands, operating under a special use permit.
GOAL 3: Promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.	
Objective 3.1 Volunteers	
Strategies ● No program	*Over the 15 years of CCP implementation:* ● Develop and maintain a list of volunteer projects and recruit on an as-needed basis.
Objective 3.2 Community Outreach	
Strategies *Continue to* ● Inform visitors at other units of the Refuge Complex and local residents about Featherstone Refuge and its resources through the media, interpretive materials available at Occoquan Bay refuge visitor contact facility, and our website. ● Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities. ● Respond to inquiries written, telephoned, or made in person by the public.	In addition to alternative A strategies, *Over the 15 years of CCP implementation:* ● Conduct outreach efforts, when needed, to enhance local community relations.

Alternative A **Current Management**	**Alternative B** **Enhanced Management** **(Service-Preferred Alternative)**
GOAL 3: (cont.) Promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.	
Objective 3.3 Elected Official Outreach	
Strategies *Continue to* ● Provide written or personal briefings for local officials and members of Congress or their staffs, as needed or as requested, to inform them about important events or about issues affecting the refuge.	In addition to alternative A strategies, *Over the 15 years of CCP implementation:* ● Enhance outreach to Federal, State and local officials to share benefits of refuge programs
Objective 3.4 Research	
Strategies *Continue to* ● As opportunities arise, continue to support research that is compatible with refuge purposes, goals and objectives.	*Over the 15 years of CCP implementation:* ● Identify and prioritize research and monitoring needs for the refuge. ● Encourage partners to conduct research and assist them in seeking alternative funding sources.